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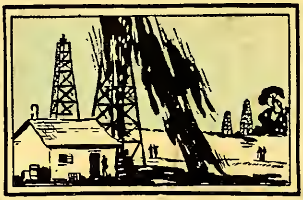

The Manta

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Report of Research Bureau

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Louisiana Bullfrogs

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Northwest Louisiana Game and Fish Preserve

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Oysters As a Summer Food

Published Monthly by the
Department of Conservation

JUNE
1932

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JAMES P. GUILLOT . . . . Editor
N. E. SIMONEAUX . . Assoc. Editor
WM. G. RANKIN . . Business Mgr.

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New Source of Rayon Found in Sugar Cane Waste Product

DISCOVERY of a new source of rayon, in bagasse, the refuse from cane sugar production, was announced April 9 by the Department of Agriculture.

Department chemists used cheap nitric acid in developing the process, according to the announcement, and it is regarded as commercially feasible in view of low acid costs. There has been increasing need for a new source of raw material for rayon, the Department said, and the process provides a large new source available every year. The statement follows in full text:

A new source of rayon has been found by the Department of Agriculture. Using low-priced nitric acid, chemists of the Department have developed a process for making high grade cellulose, base material for rayon, from bagasse, the waste from sugar cane after the sugar has been extracted. The process is important to rayon producers as it indicates a large new source of raw material, available each year. Most rayon producers now depend upon wood pulp for cellulose.

From 250,000 to 500,000 tons of bagasse accumulated each year at the sugar cane mills of the United States. For several years much of this has been used for manufacturing insulating building material, but the possibility that a higher grade of cellulose could be produced from bagasse led the chemists to experiment with it. The sugar mills have used quantities of bagasse for fuel since most of these mills are in regions where fuel is scarce, and the price the pulp manufacturer would have to pay depends somewhat on the cost of replacing bagasse with coal oil or gas fuel.

The method, known as the nitric acid pulping process, consists of soaking the raw material in a weak nitric acid solution for several hours at a medium temperature, then heating it for an hour and finally washing and boiling in dilute sodium hydroxide to produce a soft, bleachable pulp.

The experiment indicating the possibilities of the method were made by D. F. J. Lynch and M. J. Goss, of the Color and Farm Waste Division of the Bureau of Chemistry and Soils of the Department. These experiments produced a higher percentage of high grade cellulose from bagasse than any previous attempts.

Cheaper supplies of nitric acid make the new process commercially feasible. With gradually diminishing forests, and with the forest supplies receding from the manufacturing centers each year, there has been an increasing need for a new supply of raw material for rayon manufacturers and other celluose industries. The possibility of using nitric acid in the cellulose process has been known for some years, but until recently the acid has been too expensive for commercial pulping.

Some of the advantages of the nitric acid pulping process as compared with the older methods of processing bagasse are that open tanks are used instead of pressure tanks and that it takes less heat, power, and time. The nitric acid solution may be used over for several times.

Louisiana's New Governor Ardent Conservationist

HON. OSCAR K. ALLEN, Louisiana's new governor, who was inaugurated on May 16, has demonstrated in a number of ways that he is deeply interested in the conservation of Louisiana's natural resources.

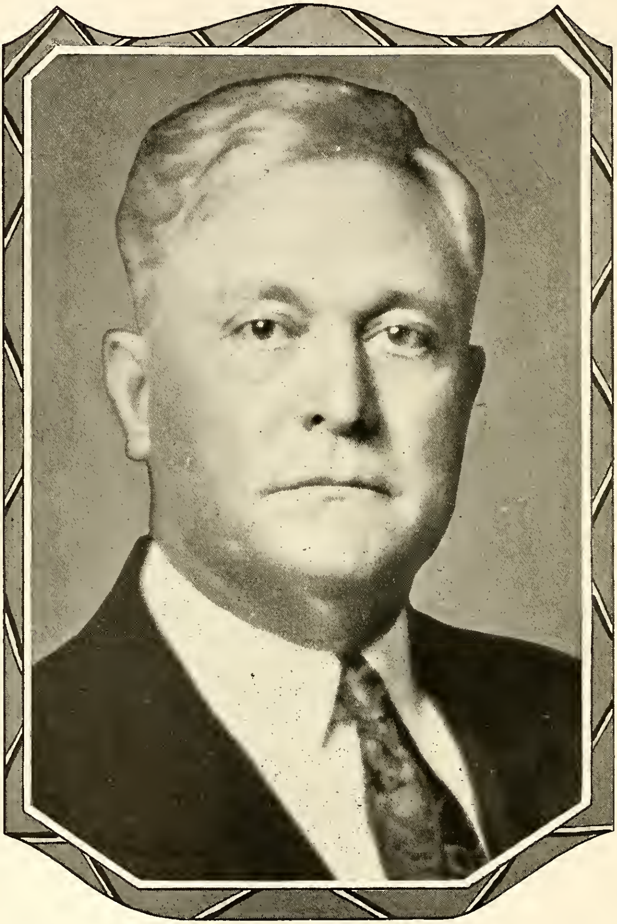
Besides cooperating in various instances with the Department of Conservation while he was chairman of the Highway Commission, Governor Allen has taken particular interest in the creation by legislative act of the Northwest Louisiana Fish and Game Preserve. He has been one of the leading spirits in the establishment of this great project. He was one of the first to donate to the state of Louisiana considerable acreage which he owned in and adjacent to this project.

Governor Allen further evidenced his cooperation by prevailing upon other land owners to dedicate their lands to the state, through the Department of Conservation, for the use and purposes of this preserve as established by statute.

As there were more than one hundred land owners holding acreage within the confines of this preserve, the services rendered by Governor Allen to the Department of Conservation in carrying out the legislative will, were particularly helpful, and in this signal service, much difficulty was overcome in the final negotiations with the various land owners.

A detailed report covering the creation and the engineering features of this preserve will be found elsewhere in this issue.

The Department of Conservation looks forward to the continued good will and active cooperation of Louisiana's new Governor in the pursuit of its future activities during his administration.



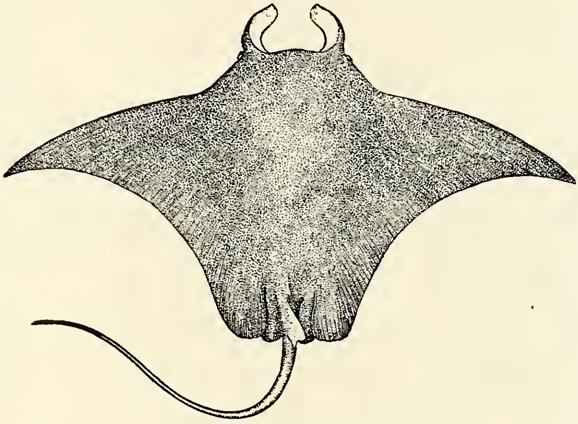
HON. OSCAR K. ALLEN
Governor of Louisiana

THE MANTA - - - A Louisiana Giant of the Sea

By JAMES NELSON GOWANLOCH
Chief Biologist, Bureau of Research, Department of Conservation

RECENT reference in the news to the capture of a large Manta or Devil Fish has brought to the attention of many people the presence of these extraordinary and still mysterious fishes in the waters of the Gulf Coast. It is thought desirable, in response to many requests concerning these spectacular sea creatures, to here present some brief account of their form, their nature and their habits.

Mantas, also known under the names of Blanket Fish, Sea Devils, Devil Fish, and Sea Bats, are in reality gigantic members of the Ray Family. "Manta," it may be stated, is the Spanish word for blanket and it is by this name that the Manta is popularly known in Spanish speaking lands. It should perhaps also be pointed out that although the name Devil Fish is applied to the Manta, that term is more generally used to designate a completely different animal, the Octopus. The Octopus is a strangely modified Invertebrate, belonging, as a matter of fact, to the great class of Mollusks, the Shell Fish. Profoundly altered, it has lost all evidences of its shell, and like its relative, the Squid, it has traveled far in the development of an active, roving life.

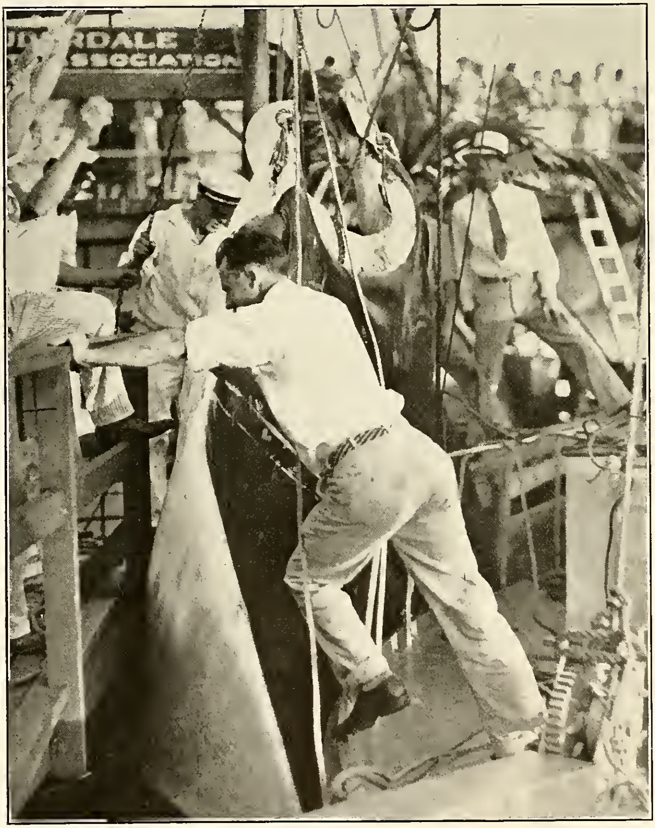


The Great Manta, Sea Devil or Blanket Fish. This drawing shows the animal in its natural position when viewed from above. The eyes appear as slight bumps on each side of the head, just behind the "feelers." This illustration is taken from the Department of Conservation's Bulletin "Sea Fishes and Sea Fishing in Louisiana."

Closely related to the Eagle Rays and more remotely to the familiar Sting Rays or Stingarees, the Mantas belong to a fish family technically designated as the Mobulidae or Sea Devils. They are members of that great class of fishes, the Elasmobranchs, which, including among their numbers all Sharks, all Skates and all Rays, are characterized by the fact that their skeleton contains no true bone but is composed of a less rigid substance termed cartilage. Indeed, there are numbered among the Elasmobranchs some of the sea's strangest creatures such as the Man-eating Shark, the Hammerhead Shark, the Electric or Torpedo Rays and our familiar and astonishing Louisiana Sawfish.

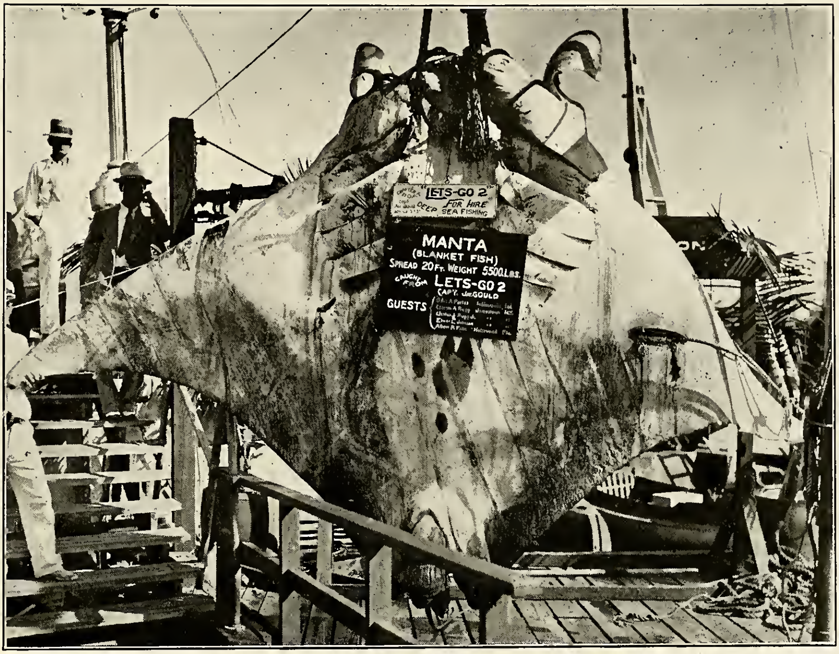
Mantas arrest the attention by their size, their form and their strange behavior. Two species occur along the coast of Louisiana, one, the small Devil Fish (*Mobula olfersi*), the other, and the species to which the present article is devoted, the Great Manta or Sea Devil (*Manta birostris*).

While fishing in Florida waters in mid-February of this year on his forty-foot, powered fishing boat, Captain Jay Gould of Hollywood, Florida, encountered, and after a long and thrilling interval, captured one of these great fishes. Photographs of this specimen accompany the present account. In correspondence with the writer, Captain Gould stated that he first hooked this monster on a rod and reel after which he succeeded in engaging it on a large shark hook on twelve hundred feet of one-half inch rope. In the party aboard this vessel were several sportsmen, including Otis A. Porter, widely known as the man who times so many great races from the Indianapolis Speedway events to Gar Wood's motor-boat world records. Included also among the adventurers was eight-year-old Clay Rugg, Jr., who accompanied his father, Clay A. Rugg, of Jamestown, N. Y., and enjoyed to the fullest excitement granted to few small boys. Some reference to the details of this capture will be of interest. Captain Gould was cruising only about three quarters of a mile out of the harbor at Fort Lauderdale when the first Manta was sighted, basking on the surface of the sea. Mr. Rugg, trolling for King Fish at the time, managed to hook the Sea Devil. Using the slender line as a guide to the location of the Manta, which paid no attention at all to the fact that he had been caught by this small hook, Captain Gould drove a hastily rigged harpoon deeply into the fish. The Manta came into instant action, shot forward and in a moment snapped the inch-rope like a thread, then again returned to its lazy basking at the sea's surface. The party of fishermen were then astonished to see instead of one Manta, three of the immense creatures, one of the new-comers so large that it seemed to dwarf the animal first attacked. The powered sea fishing vessel was then steered directly over this biggest of the Mantas while Captain Gould, dangling a six-inch shark hook from the stern, succeeded in hooking the Sea Devil through the shoulder of one of its huge wings. Although this time the shark hook was fastened with only a one-half inch rope, expert manipulation in response to the swift changes in the pull as the great beast repeatedly altered its speed and its direction, enabled the sportsmen to hold this immensely powerful creature on a line so relatively small. The boat was going forward at about half speed when the Manta was hooked and Mr. Porter maintained this speed except when it was evident that the strain on the line was reaching the breaking point or when the line, being paid out and withdrawn by means of a turn around a stanchion, was nearing its end. It is impressive indeed to note that while the engine was attempting to push the ship forward and drag the Manta along, the great Sea Devil first slowly brought the boat to a stand still, then started dragging it backwards against the pull of the engine so that at last when the monster was thoroughly aroused, it pulled the boat backward at a speed of six knots against engines running at a speed that normally would have driven the boat forward four or five knots. To the strength of the gentlemen clinging to this line during the thrilling hours that followed, eight-year-old Clay Rugg, Jr., lent his fullest powers. Several times the line neared its end, and as Mr. Albert P. Fritz of Hollywood, Florida, afterwards stated, "I planned, if he got those last few feet, to go overboard with the end of the rope. I was confident that the fish would stop and rest as soon as the strain on the line stopped and that Porter could turn the boat and pick me up without any great risk. Our hands were blistered and raw. It was like trying to hold a locomotive with a turn around a pine tree and the fight lasted for hours. We first sighted the fish a little before one o'clock and we had the big one hooked at 1:10 p. m. He pulled us up and down the coast and occasionally headed out as though he were going straight to Africa. At one time two steamers were passing and he made right for them. We were just about to turn loose to avoid a collision when the fish shied off enough to miss one steamer and the Captain of the other, seeing what was going on, headed his ship east and out of the way."



Nineteen foot Manta captured by Captain Jay Gould. The photograph was taken a moment before the weight of the animal stripped the gears of three one-ton chain hoists. This photograph has been kindly provided by Captain Gould.

Time passed and after four hours the Manta began to tire. It was then possible, by careful manipulation, to pull the vessel near enough to the fish for Captain Gould to shoot the monster several times with a high powered rifle. Again, completely



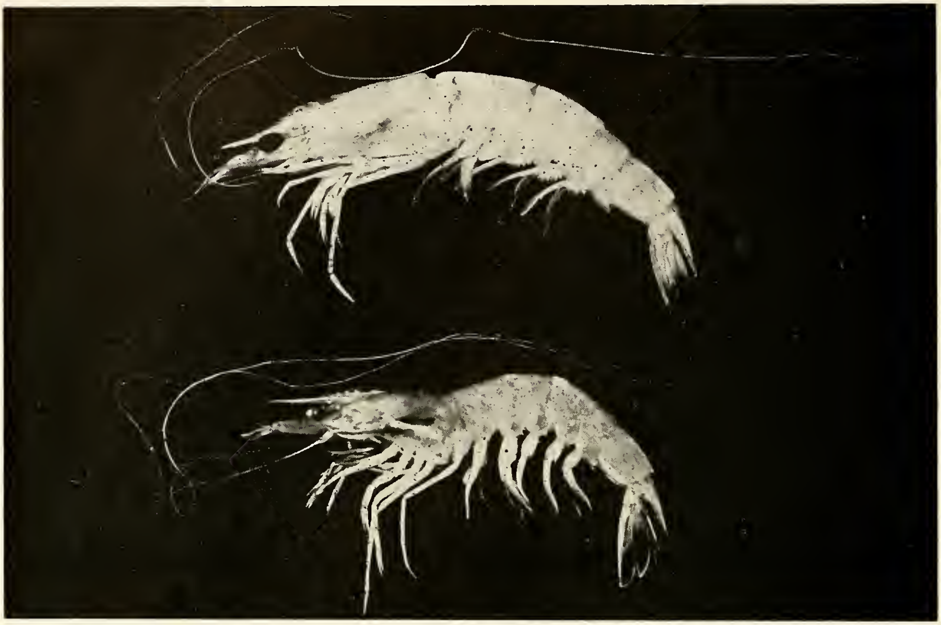
The same specimen of the Great Manta, viewed from below. Note the wide conspicuous gill slits which appear on each side of and above the sign fastened to the animal. The cephalic lobes or "feelers" are curled back on each side. The size of this great fish can be scaled from the figure of the man standing at the left. This striking illustration was provided through the courtesy of Captain Gould.

aroused by this action, the Sea Devil sounded until its dive ran out one hundred and twenty feet of line. Again the sportsmen faced the danger of sinking their ship, since the pull of the Manta brought the vessel stern down until only an inch or two of freeboard was left. As Mr. Fritz stated, "We were all ready to turn loose again, but several waves passed and none quite went over the side, so we hung on." After much difficulty and hard work, the Manta was slowly pulled to the surface, made fast and towed back to port. So great was his weight that the gears on three one-ton chain hoists were stripped and not until the services of the city crane were brought into use could the massive beast be lifted from the water.

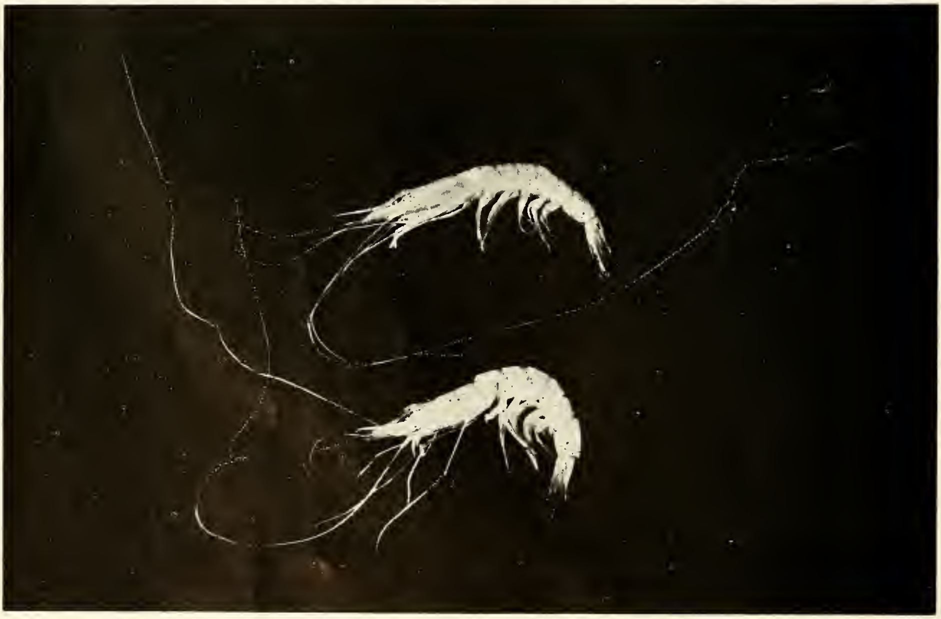
Captain Gould informs the writer that this Manta measured nineteen feet eight inches from wing tip to wing tip and eighteen feet nine inches from the tip of his head to the end of his tail. He estimated the weight at about 5,500 pounds, this figure being based upon the fact that in the first attempt to raise the animal, three wrecking cars, each with a chain hoist guaranteed to lift one ton, were put to work, but when the Devil Fish was only a third out of the water, the gears stripped, as related above. The first of the accompanying photographs was taken at the very moment before this break-down occurred. The second photograph, taken after the successful use of the city's twenty-ton crane, gives a clear impression of the vast mass of this Manta when scaled against the figure of the man in white standing at the left of the photograph. The third illustration, taken from the Department of Conservation's Sea Fishes Bulletin, shows the normal appearance of the Great Manta when viewed from above. The curious horn-like structures, often termed "feelers," that appear at the sides of the head of the animal are, in reality, forward extensions of a lobe of the pectoral fins. It is supposed, by many students of these fishes, that these "feelers" are used in aiding the Manta when it sweeps food materials into its mouth.

Further aspects of this notable adventure impressed the sportsmen involved. Mr. Fritz states, "A peculiar thing was that the other two Mantas had followed throughout the battle, one with a harpoon still sticking in it. They remained on each side of the fish that we had hooked and turned every time it turned. Apparently they wanted to help it free itself and were apparently two females of the herd of which the big bull we had hooked was the leader. They even followed right up to Port Everglades after we had killed the big fish and were taking it in." This charitable interpretation of the behavior of the Manta's companions is quite probably by no means jusitfied. Indeed, it is much more likely that the other two Sea Devils were stimulated and attracted by the blood flowing from the captured animal. The

(*Continued on page 30*)



THE SEA SHRIMP, *Penaeus setiferus.* This species, one of the three kinds of Sea Shrimp commercially used, forms the great bulk of this fishery. The movements, growth and life history of the Sea Shrimp are being carefully studied by the Research Bureau of the Department of Conservation in cooperation with the Federal Bureau of Fisheries, as indicated in this report.



THE SEA BOB, *Xiphopenaeus kroyeri.* Popularly called Sea-bob, probably from the French six barbes or "Six-beards," the Sea-bob is one of the three commercial Sea Shrimp an investigation into which is being now conducted by the Bureau of Research of the Department of Conservation in conjunction with the Federal Bureau of Fisheries, so that adequate protection can be given to this valuable natural resource.

Report of Bureau of Scientific Research and Statistics *

HU B. MYERS, Director
J. N. GOWANLOCH, Chief Biologist

THE development and administration of wise, adequate and satisfactory conservation measures inevitably depend upon a sound knowledge of facts concerning the resources themselves. An eminent American writer on commercial fisheries has admirably expressed this point of view when he says that research "is the oracle of truth in this matter, and whoever shuns its ministrations convicts himself of false purposes."

It was in realization of this fundamental need of compiling scientific data regarding Louisiana resources that Commissioner Robert S. Maestri, and James P. Guillot, Secretary of the Department, after a consultation with technical and legal experts, drafted and proposed to the legislature a bill to authorize the creation of a Bureau of Scientific Research and Statistics, as a Division of the Louisiana Department of Conservation. This bill was enacted as Act No. 45 of 1930.

THE SOUTHERN SEA HORSE
Hippocampus stylifer

This bizarre denizen of the sea occurs regularly along the Gulf Coast and more than any other Louisiana fish arouses the most intense interest whenever it is found. The Sea Horse is one of the great number of sea fishes described in the recent "Sea Fishes" bulletin of the Department of Conservation which deals with the game, commercially important and other sea fishes of our State.

Although the special funds provided under Act No. 45 of 1930 for the Research were not yet available, owing to the fact that the appropriation was made out of surplus funds and other appropriations took precedence out of the surplus, the Commissioner considered inauguration of the Research Bureau so vitally important that he created a preliminary scientific organization, financed temporarily out of the general funds of the Department, and this organization has been actively co-operating with the Federal Research Bureau and the United States Bureau of Fisheries and the United States Bureau of Biological Survey since February, 1931. Wide indeed are the fields of work indicated legislatively for the Bureau of Research, since they include the scientific study of Louisiana's natural resources, fisheries, both fresh water and salt water, shrimp, oysters, fur-bearing animals, forestry products, minerals and other natural resources of our State. It is, therefore, clear that, although ranking as a division of the Department of Conservation, the Bureau of Research must in a multitude of ways touch upon the activities of other departmental divisions and must serve as a clearing house for their problems.

There is often in the popular mind the mistaken belief that pure science and applied science are different things; nothing could be less true. Applied science involves and demands the same accuracy in investigation and care in interpretation as do the strictest laboratory experiments. Applied science is merely what its name indicates, the application of strict scientific methods to the solution of the practical problems of men. It requires careful judgment of what part of the problem is most likely to yield the information required and thus provide for human use the needed understanding of the factors involved in the practical problems that arise.

SHRIMP INVESTIGATION IS FIRST DUTY OF RESEARCH BUREAU

Embodied in the Act authorizing the Bureau's establishment was the specific instruction that the sew division should, as one of its first tasks, investigate the Louisiana Sea Shrimp. This is explicit and clear.

"Section 6. As the life habits of the sea shrimp have never been studied even by the Bureau of Fisheries of the United States of America, as affecting those sea shrimp in the waters of the Atlantic Ocean and the Gulf of Mexico, and the bays, bayous, lakes tributary thereto; and as a serious difference of opinion exists among those engaged in the sea shrimp industry, as to whether the time when, the places where, the manner and methods and the means with which the sea shrimp are being presently taken are proper and calculated to insure a continuity of supply, or an even-

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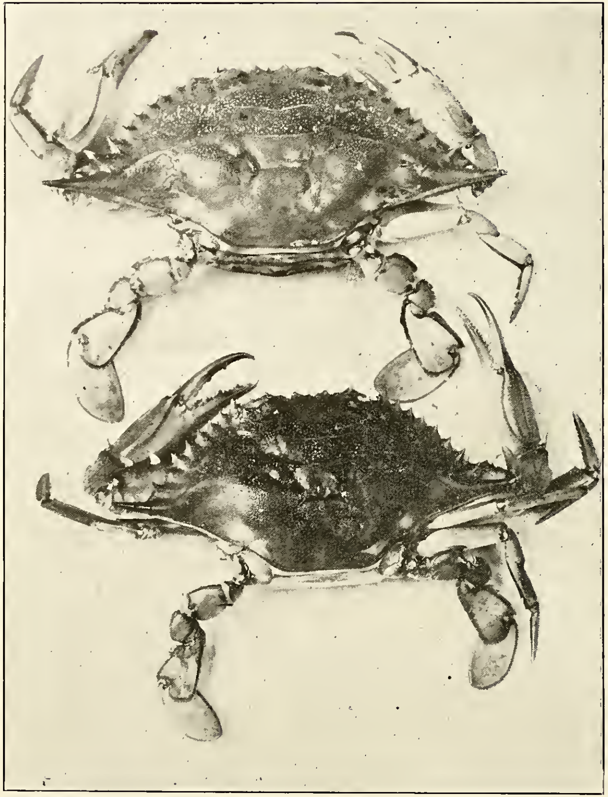
*Tenth Biennial Report of the Department of Conservation of Louisiana, May, 1932.

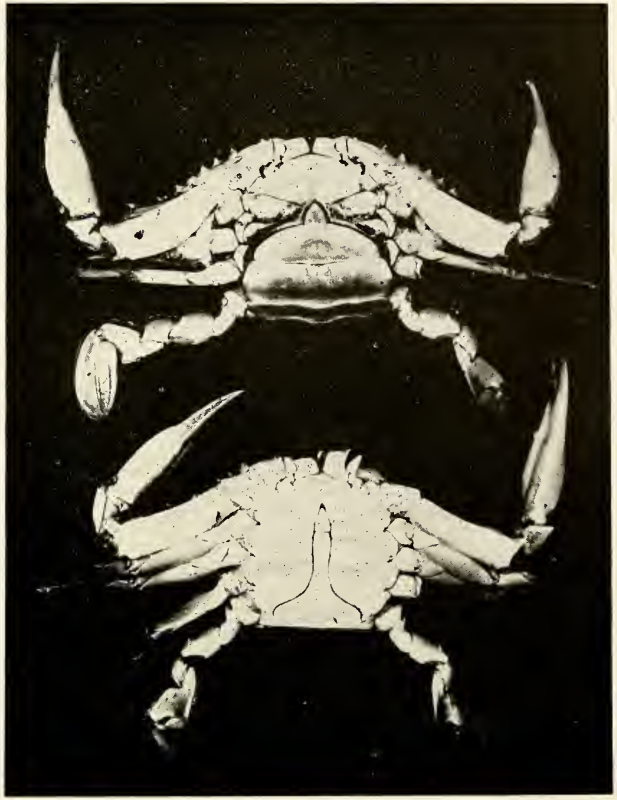


THE BLUE CRAB

Callinectes sapidus

The Blue Crab is the basis of an important Louisiana fishery, producing in 1931 a total of over four hundred and thirty-three thousand dozen with a value of over $201,000.00 and an additional production of over $89,000.00 worth of crab meat. The Bureau of Research has responded to numerous requests for information concerning the methods of producing soft shell crabs.

In the above illustrations the upper is the male and the lower the female.



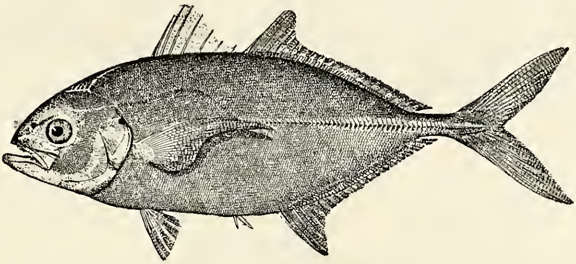
THE BLUE CRAB

Callinectes sapidus

The above shows the under surfaces of the two individuals illustrated at the left. The upper figure delineates clearly the broad abdomen characteristic of the female, while in the lower figure the narrow abdominal segments of the male are easily distinguished.

The Bureau of Research has repeatedly been called upon to provide information concerning the methods of catching and handling this valuable commercial resource of our Louisiana waters.

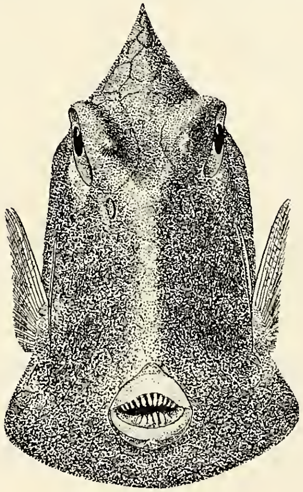
tual extermination of this natural resource, the Commissioner of Conservation is directed to cause to be begun at once a scientific study by a competent biologist or biologists of the life habits of these sea shrimp, and to secure and compile all statistical data possible so that at the earliest moment possible a report may be made by such biologist or biologists to the director of the Fisheries Division of the Department of Conservation to be submitted by him to the Commissioner of Conservation with his recommendations and to be acted upon in due course by the Commissioner of Conservation in accordance with the provisions of Section 5 of this Act, in so far as he may be able to so do under existing statutory law; but as the purpose of this Act, through the Bureau of Scientific Research and Statistics, is to create a fact-finding division of the Department of Conservation to advise the Commissioner of Conservation in technical matters affecting the natural resources under his control, if any finding of fact, approved by the Commissioner of Conservation, involves the necessity of legal regulation in the time, place, conditions, manner, means or methods of reducing to possession and/or of commercially utilizing any natural resource, the Commissioner of Conservation is hereby authorized, directed and required to submit through the Governor of the State in the form of a proposed legislative act for consideration at the next legislative session, the recommendations approved by him, in the manner hereinabove provided so that the Legislature of the State of Louisiana, in accordance with Sections one and two of Article VI of the Constitution of the State of Louisiana, may enact such recommendations into statutory law, if it desires so to do.”



JACK, CAVALLA OR CREVALLE

Caranx hippos (Linnaeus)

A spirited game fish, the Jack is one of the many reasons for Louisiana's popularity among anglers. Jack Fish bite well on either silver spoons or Sardine bait and put up a spirited fight. Specimens weighing as much as forty pounds have been caught on the Louisiana Gulf Coast.



THE COWFISH

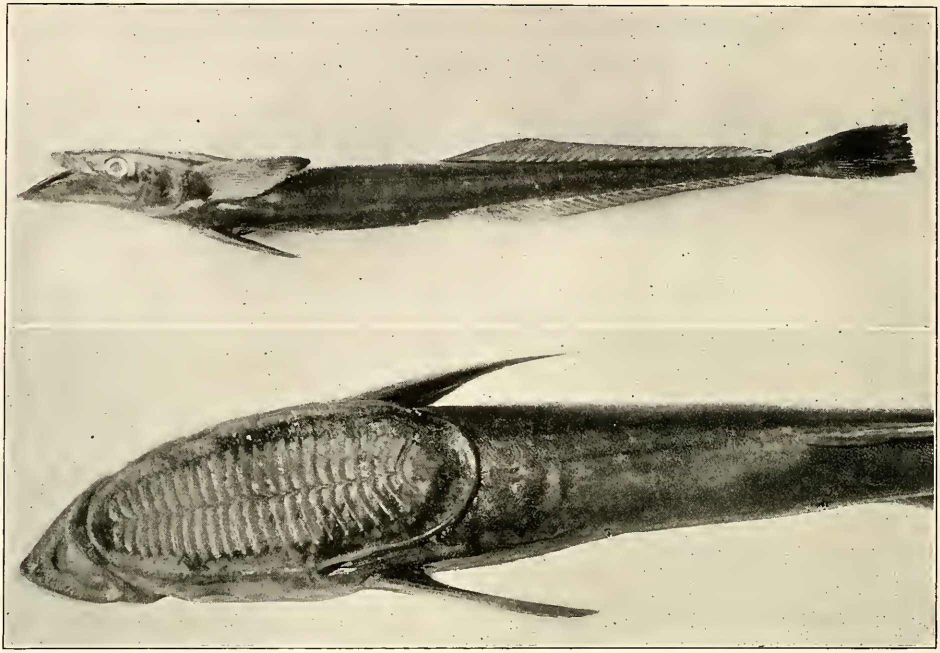
Lactophrys tricornis

One of the typically tropical Trunk fishes, the Cowfish is another example of the odd species which the Bureau of Research has been called upon to identify. The Cowfish, so named because of the two small horns in front of its eyes, occurs regularly in Louisiana and is illustrated and described in the recent “Sea Fishes and Sea Fishing in Louisiana” published by the Bureau of Research and the Division of Fisheries.

In strict compliance with these instructions, a wide and searching investigation into the Sea Shrimp was organized and has for a year been in full progress. The technical findings of these researches depend for their value upon the thoroughness with which they are carried out and especially upon the accumulation of the scientific data over a sufficiently long period of time so that the influences of various changing factors may be properly understood. It is for this reason that the Federal Government, in planning their co-operation, definitely looked forward to a program of at least five years. The Southern Canners Exchange has co-operated fully with the Department of Conservation in this work. Somewhat later in the present report more detailed reference will be made to the organization, conduct and progress of this Shrimp Investigation.

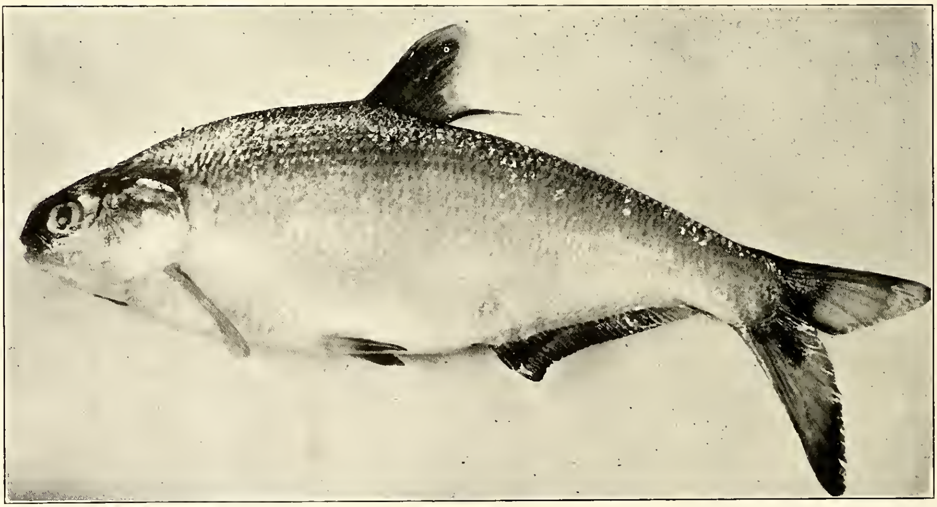
The annual shrimp production in 1930 totaled over one hundred million pounds and was eighth in volume and fifth in value of all United States fisheries. The Department of Conservation in conducting this investigation has planned a wide, thorough program; for it is only by such means that the needed understanding of the basis of this extremely important Louisiana industry can be secured.

The biology of the sea shrimp is extremely obscure. Subject to the greatest irregularity in their movements—present at one time in immense numbers and then apparently completely disappearing—these economically valuable



THE SHARK SUCKER OR REMORA
Echeneis naucrates Linnaeus

The above specimen of this remarkable fish was secured attached to an eight-foot Gulf Shark, *Carcharhinus platyodon,* and is one of the immense variety of specimens brought to the Bureau of Research for information and identification. The photograph clearly shows the extraordinary sucking disc by means of which this strange species attaches itself to sharks and other large fishes for transportation. Reference to the habits of these curious animals will be found in the recent Sea Fishes Bulletin published by the Department of Conservation.



THE GIZZARD SHAD

Gizzard Shad appear in great numbers in the Mississippi and other rivers during their spring "runs." Although coarse in flesh, they are fairly palatable. Their great importance lies in the immense part they play as food for other fishes. They form a large element in the food of important commercial and game fishes, yet themselves feed upon minute food that would not otherwise be available for the fishes that are valuable to man. Specimens of Gizzard Shad were among the wide variety of fishes brought to the Bureau of Research for identification and information.

animals have presented a problem of such a complicated character that it is only by an extensive, well planned, persistent and systematic program of research that the needed facts are coming to light. It is quite evident that proper conservation laws are imperative to maintain the necessary supply of materials for the fishery and it is equally evident that success in drafting the essential conservation laws must depend upon a broad and sound knowledge of scientific facts.

THE BAT FISH

Ogcocephalus vespertilio

This sea fish, so often caught by shrimp trawlers, arouses, because of its extraordinary appearance, the intense curiosity of everyone into whose hands it falls for the first time. Inquiries for its identification have frequently been received by the Bureau of Research. It is illustrated and described in the recent "Sea Fishes and Sea Fishing in Louisiana."

Three species of sea shrimp are commercially used; *Penaeus setiferus* forms the great bulk of the fishery, *P. brasiliensis* is also utilized while the smaller Sea-bob or "Six-beard," *Xiphopenaeus kroyeri,* is dried for commercial purposes. Sea shrimp, strangely enough, are the least understood of all American commercially important food animals. Although they have been an important fishery over a period of at least fifty years, the place of their breeding and the earliest stages of their development have been unknown. This is in part due to the fact that our Sea Shrimp, unlike certain other Sea Shrimp and River Shrimp, do not appear to carry their eggs but cast them out into the sea where they hatch into an exceedingly minute and primitive form, the nauplius, so tiny that a dozen could rest on the head of an ordinary pin. Thereafter the young shrimp pass through a series of complicated developmental forms.

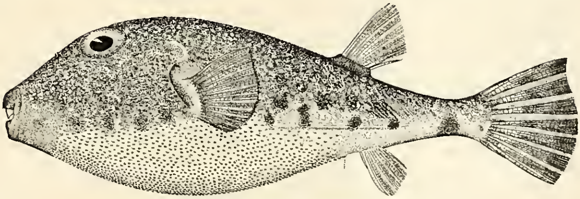
No modern account of the development of the shrimp is available, and this important gap is one of the many in our knowledge of shrimp biology that it is hoped will be filled by the present investigation. Published work on the early stages in the shrimp's life is meagre and fragmentary and goes back to over sixty years ago, when certain more or less scattered observations were made by Professor Brooks of Johns Hopkins University. A Japanese scientist, now deceased, Dr. Kishinouye, has published some studies on a species of marine shrimp which occurs in Japanese waters and is closely related to our Louisiana species.

Rapid Rise in Shrimp Industry

The rise in the shrimp industry has been remarkable. Analysis of the records of the total catch covering the period from 1880 to the present time indicates on the whole, a doubling in the growth of the fishery about every eight and one-half years. Louisiana is greatly the largest single producer of shrimp, contributing about forty-three percent of the total catch. The processing and marketing of the catch has been modified by changes in methods, such as the development of canning. A recent address delivered before a conference of canners by Mr. John Dymond, Jr., President of the Southern Canners Exchange of Louisiana, has clearly defined the problems that this vastly important industry faces. With reference to the Shrimp program now being carried out by the Department of Conservation, Mr. Dymond states that from this investigation, "We expect real conservation recommendations that will insure a continuation of our source of supply of raw shrimp."

Field Program Begins

Field work on the cooperative program began on March 10th, 1931, when the scientists of the Bureau of Research, together with the scientists of the Federal Government, made an initial trip on the *Royal Tern,* one of the vessels of the Department of Conservation. This preliminary ten day survey covered the area from the important shrimp fishing grounds off Main Pass, to the also important shrimp fishery centering around Grand Isle.



THE SOUTHERN SWELL FISH

Spheroides spengleri

This species of Louisiana salt water fish is popularly known as the Puffer because of its extraordinary ability to swallow air or water until it becomes grotesquely globe-like. It is one example of the great many of our odd fishes, specimens, descriptions and inquiries concerning which are constantly pouring into the Bureau of Research for identification and answer. It is illustrated and described in the recent "Sea Fishes and Sea Fishing in Louisiana," published by the Department of Conservation.

It was part of the cooperative project that a vessel suitable for the conduct of a systematic sea program was to be provided by the Bureau of Fisheries of the Department of Commerce of the Federal Government, while the responsibility of the necessary rebuilding and refitting of this vessel would be borne by the Department of Conservation of the State of Louisiana. This promise the Bureau of Fisheries has fulfilled. Foreseeing, however, the inevitable delay involved in the necessary proceedings in the finding and transfer through various Government Departments of this boat, steps were taken to make possible an immediate commencement upon the research work. A sixty-three foot oyster lugger, the *Champion*, was chartered for the months of May to August, inclusive, and this vessel was immediately fitted with the equipment necessary for experimental shrimp trawling, water sampling, temperature studies and other research activities. It should be noted that all this equipment was transferred to the new research boat when the latter was secured so that no unnecessary expenditure of money occurred, the purchase of this equipment representing a permanent addition to the Research Bureau.

The first trip on the *Champion* was begun on May 19th and throughout the period of her charter she was kept more or less steadily at sea engaged in the Shrimp Investigation. Such trips, usually lasting about twelve days, made possible the steady and systematic accumulation of information so essential in this work. Grand Isle was chosen as the base for the field work and a wide, regular program of shrimp trawling, tow nettings of larval shrimp, shrimp measurements, studies of water temperatures, chemical tests of the water and hydrographic observations of other kinds were systematically carried out, the researches extending in area from as far east as Bay St. Louis to as far west as Timbalier, and involving several trips off shore to a distance of one hundred and thirty-five miles in the pursuit of special studies.

Between the period of the termination of the charter of the *Champion* and the final outfitting of the new research boat, various vessels of the Department of Conservation fleet were used in the conduct of the field work, thus avoiding any break in the program of investigation.

The Research vessel finally secured is the *Cormorant*, a boat fifty-seven feet in length with a fourteen and one-half foot beam and a four and one-half foot draft. She is driven by a one hundred and fifty horsepower motor. The responsibility and costs of rebuilding the cabin of this boat and fitting her for her new work were undertaken by the Department of Conservation and the vessel was remodeled under the direction of Mr. Phillip Gehlbach, Superintendent of the Flotilla of the Department of Conservation. The work was done at the Department of Conservation's boat headquarters, located on the New Basin Canal. The *Cormorant* is exclusively devoted to the carrying on of scientific research in the waters of Louisiana and has thus far been exclusively used for the steady and systematic progress of the Shrimp Investigation. Her trips at sea are usually ten to twelve days in length and this time is chiefly spent in the shallower coastal waters of Louisiana where there are centered the most important commercial shrimp fishing areas. In addition to her crew of three members, the *Cormorant* carries a staff of three or four scientists on every trip. On several occasions visiting scientists have, upon invitation, participated in a Shrimp Investigation trip for the purpose of carrying on special studies on other commercially important marine problems of Louisiana, such studies, however, altering in no way the regular performance of the shrimp program.

The *Cormorant* is now well equipped with gear of commercial specifications for shrimp trawling, together with an excellent equipment of the necessary scientific instruments for carrying on precise marine studies of those changes occurring in the sea which affect the movements and behavior of shrimp. Such instruments include, for example, Greene Bigelow water bottles and Negretti and Zambra reversing thermometers and cases, bottom samplers of various types, instruments for the measurement of the turbidity of water, apparatus for the accurate study of changes in the acidity and alkalinity of sea water, and a very complete equipment of plankton nets and other apparatus, by means of which careful collections are systematically gathered of the microscopic early stages of the commercial shrimp. Thus in a carefully planned, orderly way there is being built up a vast mass of facts which will make possible the intelligent understanding of those marine conditions which are important, not only for the shrimp industry but for the oyster industry and our other Louisiana fishery activities as well. It must again be pointed out that the gathering of these facts is a slow process since the volume of data to be interpreted must be large before the conclusions can be regarded as valid. The success of such scientific investigation as is here being conducted into the Sea Shrimp, must inevitably depend upon careful and fundamental research. The results thus secured are not spectacular overnight opinions based upon hasty and superficial examination of few facts but are, instead, derived from patient, time-consuming, accurate searching for the necessary facts, searching that must be systematic in discipline and diversified in method.

The program of this Investigation participated in as it is by members of both the staff of the Bureau of Fisheries and the Department of Conservation, has been planned and carried out in the fullest coordination so that there is no wasteful overlapping of activities. The highest degree of efficiency can thus be attained.

It is impossible, of course, to predict with certainty when such an investigation as that which we are now conducting into the life history of the shrimp will have progressed to a point where definite conclusions can be made, but we are very hopeful that we shall have specific recommendations ready to submit before the end of the calendar year.

GREAT IMPORTANCE OF STATISTICAL STUDIES

A definite knowledge of the abundance of any commercial fishery is the primary aim of all fisheries investigations, as a thorough understanding of the abundance is necessary in order to protect the industry, to insure the people of the state depending upon the fishery and to maintain a supply for future generations. An adequate statistical record of the "take" in any commercial fishery is the basis for all estimates, either exact or approximate, of the status of abundance of that particular fishery. Total monthly or yearly catch records are of value in determing the seasonal distribution of the catch and the annual progress of the industry, but in themselves are of little value in any abundance analysis. In order to arrive at an estimate of abundance from year to year, it is necessary to have, besides an exact record of the animals taken, accurate statistics concerning the amount of effort expended in securing this catch. The total yearly "take" or catch in any fishery which is not seriously depleted, is dependent upon many variables such as, number of men fishing, economic conditions, number of boats in the fishery, weather conditions, types of gear used in fishing, legal restrictions, etc. As one or all of these variables change, so changes the amount of the catch. With so many alterable factors, it can be readily seen that total catch in itself cannot be used as an indication of abundance in a fishery. On the contrary, the trend of the yearly "take" quite frequently leads to highly erroneous conclusions.

A careful examination has been made of the available shrimp statistics and it has been found that the information on hand is insufficient for an accurate estimate of the abundance of this highly important fishery. Consequently, we wish to recommend a method of gathering these statistics, which method has been used in other states with excellent results. We are now preparing for submission to the Commissioner of Conservation a thorough report with recommendations covering our investigations on this subject.

EXTENT OF FIELDS FOR STUDY

It is quite clear, in the Act creating its existence, that the activities of the Bureau of Research and Statistics are by no means to be confined to the study of shrimp. All those natural resources of the State, which the State as guardian must effectively conserve, come within the provisions of the Bureau's activities. Specifically mentioned in the Act are such matters as the wild animal life of the state as follows:

"Section 7. A study of the wild animal life of the State, particularly in relation to the life habits of those animals whose furs are used for commercial purposes, including a study of any differences that exist in habits of breeding, and in the time when the furs of such animals are in their primest condition, as affected by location in different parts of the State, shall be made as early as practicable in order that the industry may profit from such information and be intelligently developed. A report covering these investigations shall be made by the Biologist or Biologists employed, and same shall be submitted to the Director of the Division of Fur and Wild Life, to be transmitted by him, with his recommendations, to the Commissioner of Conservation to be acted upon by the Commissioner of Conservation in due course in accordance with the provisions of Section 5 of this Act."

OTHER PROBLEMS UNDER CONSIDERATION

The Director of the Bureau of Research has been engaged in the consideration of the most improved and satisfactory methods in the construction and management of fish hatcheries and the most efficient methods for the distribution of fish hatchery output. It is obvious that the Research Bureau should serve as the clearing house for special problems that arise in the operations of the various fish hatcheries of the Fisheries Division of the Department of Conservation.

Numerous other matters relating to fisheries, both game and commercial, are constantly brought as problems to the Bureau of Research.

The Director of the Bureau of Research has exspent much time and effort in the survey of the Louisiana wild life sanctuaries and the control thereon of predatory animals. These bird refuges, because of their geographical situation with reference to the winter ranges and migration routes of our bird life, possess an importance probably unequalled by any other area in the whole continent.

The Director of the Bureau of Research, accompanied by the Chief Biologist, conducted two extensive trips of inspection with Dr. Harry C. Oberholser, the distinguished ornithologist of the Bureau of Biological Survey in Washington. It is Dr. Oberholser's purpose to survey the water fowl situation throughout the whole United States and portions of Canada in view of the long series of events and circumstances which have contributed so greatly to the reduction of numbers of water fowl, especially during the past few years. Dr. Oberholser, who a number of years ago initiated the water fowl surveys, which are now a regular source of information in the administration of the related game laws, received all possible cooperation from the Bureau of Research in the pursuit of his important investigations. The object of such a census of these game resources of the state is to secure the facts upon which must be based recommendations as to hunting season 1932-1933.

The Director of the Bureau of Research has occupied himself with considerable study of the fur industry in Louisiana and the handling of the pelts on State owned land.

The Director of the Bureau of Research has also conducted a tour of survey into the conditions existing in the oyster industry in Louisiana. Methods of propagation, the management of oyster beds and other matters relating to the proper welfare of this important industry of our State were all taken under consideration.

MAINTENANCE OF GAME BIRD SUPPLY CONSIDERED

One matter of paramount interest to sportsmen is the maintenance of an abundant supply of desirable game birds. The natural game birds and other animals of a region are subject, as has been long known, to strange and still unexplainable periods of increase and decrease in their numbers. However, apart from these so called "natural cycles" there is also the steady influence of man producing, by his activity as hunter and sportsman throughout the continent, a progressive depletion of game resources. There exists, therefore, a twofold possibility, first the maintenance of game birds naturally present by protective measures such as strict enforcement of seasons, closely restricted hunting and in some instances propagation. The second possibility is the introduction, propagation and distribution of appropriate foreign game birds so that by the united effects of such measures a satisfactory game supply may be insured for the sportsman.

The Bureau of Research has been carefully examining the possibilities of such introductions since it believes that results of great value might be secured from, for example, the use of suitable species of pheasants.

Pheasants range in nature through an immense variety of country, from snowy mountains to low and humid tropical forests. Pheasant introduction into the United States dates back at least to the time of George Washington, when the First President received at Mount Vernon a gift of Golden Pheasants from Lafayette in 1786. Since that time a great number of introductions have been experimentally made, some by public agencies such as federal, state and civic governments and some by private individuals, some under carefully watched conditions and some mere releases without further study or care. The results so far attained have varied from complete failure in some instances to quite astonishing success in other instances, such as, for example, in the State of Pennsylvania where more than fifty thousand Ring Necked Pheasants are legally shot during the short open season every year, while in New York and Washington the annual pheasant shoot in each of these States exceeds the surprising total of over one hundred thousand birds.

The Bureau of Research is gathering extensive and accurate data covering the possibilities of such game importation so that desirable steps may be taken to care for the interests of Louisiana sportsmen.

SEA FISHING BULLETIN PUBLISHED

During the year 1931, the Chief Biologist of the Bureau of Research, in cooperation with the Division of Fisheries, prepared Bulletin No. 21, entitled, "Sea Fishes and Sea Fishing in Louisiana." Ths bulletin presents a one hundred and eighty-seven page account of the important food and game fishes of Louisiana salt water, together with illustrations of a great number of those species most valuable to us in our State. As a result of the activities carried on by the Bureau of Research in the conduct of the Shrimp Investigation, opportunity has arisen to survey much of the marine life of our State and it was deemed desirable that the Chief Biologist gather together certain of these materials and present them in a form which would be available to the vast number of our citizens who are interested in fishes, either for food or for sport. In addition, there were included well illustrated accounts of a great number of those extraordinary and little understood fishes which, because of their remarkable appearance, always attract the attention of everyone who meets with them for the first time. The plan followed was to provide first an account of some salt water fishing methods, then an illustrated introduction to the natural history of fishes, their forms, colors, food habits, life and development. A careful and earnest attempt was made to indicate, for the student of our State who wishes to pursue the study of fishes further, those reference works which he would find to be most helpful. Next was given a detailed and illustrated account of the important sea fishes that have made Louisiana salt water fishing a peerless sport. Carefully discussed here will be found such species as the Tarpon, the Pompano, the Mullets, the Croaker, the Sea Drum, the Spotted Trout, the Red Snapper, the Spanish Mackerel, and others. Then follows an account also detailed and illustrated of many of our remarkable and astonishing sea fishes that universally arouse the intensest curiosity when they fall into the hands of the fisherman or of the amateur naturalist. Here will be found the Manta or Blanket Fish that weighs two tons and has a spread of twenty-two feet, the Sawfish which is excellent for food and yet so strange in appearance, the Flying Fishes that have attained in their lines so closely the form of a modern airplane, the Eel with its almost unbelievable life history, the Puffers, the Sea Horses, and others. Then there is given a collection of some hundreds of recipes for the preparation of fish foods, shrimp and oyster dishes, many of them unusual and rare Creole recipes. The bulletin is indexed to provide easy access to the information it contains.

RESEARCH BUREAU SERVES AS CLEARING HOUSE FOR INFORMATION

In addition to all its other duties the Bureau of Research and Statistics has had the task of answering innumerable inquiries relating to the most diverse subjects and has performed the service of either directly providing the desired information or else indicating to the correspondent the correct sources to which they should apply. For this work it is necessary that the Bureau develop a soundly chosen, up-to-the-minute, scientifically accurate reference library. This important work of the Bureau of Research is being attended to, so that the Bureau is rapidly becoming a clearing house for dissemination of accurate information on subjects which relate to the remarkable natural resources of our State.

As example of the diversity of problems presented to the Bureau of Research, reference may be made to two. A proposed sulphur development in southern Louisiana involved the release of five million gallons of water a day and advice was sought as to the possible effects of this waste "bleed water" on the oyster beds and fisheries of the neighboring region. The Bureau of Research took the matter under advisement and due to the fact that this Bureau already had in progress a hydrographic survey which included the region, thus making available data on the tidal movements involved, and the additional fact that the Bureau has been conducting exact chemical analyses of sea water and for this purpose has in operation a well equipped chemical laboratory, it was possible for the Bureau of Research to provide an opinion based upon an analysis of facts. The second example indicating the wide variety of problems presented, involved a report upon the poisonous character of tarantulas occurring in banana shipments. This matter had become of high economic importance for one of the large fruit companies. In response to their inquiry, therefore, the Bureau of Research got in direct communication with the leading authorities in the world on the effects of the bites of the various species of tarantulas and was able to provide the fruit company with a summary of all that is at present known on the subject and thus give them, immediately and precisely, facts that were of much value to them.

Some of the illustrations accompanying this report indicate examples of the diversity of information which has been supplied in response to inquiries directed to the Bureau of Research. The identification of fish specimens and other animals, the provision of technical data concerning new developments in freezing methods, and the supplying of descriptions of methods of preparing soft shell crabs in reply to repeated inquiries relating to this and other matters involved in commercial crab fishing, these are but a few of the problems concerning commercial fishing and other natural resources of Louisiana which have been presented to the Bureau of Research of the Department of Conservation for solution.

EQUIPMENT OF RESEARCH

The Bureau has built up carefully selected, efficient equipment for the conduct of researches it has undertaken. The organization of such equipment involves a great expenditure of effort and time, especially in the carrying out of some of the investigations involved in the Shrimp Program, since the instruments necessary for such precise scientific work are often not commercially available, but must be built in accord with specifica-

(*Continued on page 31*)

FORESTRY - -

By DR. E. S. MITCHELL
District Forest Ranger
Louisiana Department of Conservation

THE subject of Forestry has been receiving more and more attention from the general public of late years. The demands of industry have brought about the decimation of our forests at a rapid rate. Since it takes at least twenty years to grow a tree large enough even for pulp, it is easy to understand the public concern over the wanton destruction of our timber lands by ruthless cutting and devastating fires. Timber and the products of timber are being used in an ever growing list of necessary articles of food, clothing, transportation, shelter and medicine. It is absolutely necessary to cut our timber lands, but we can do still more in regulating the cutting of them and especially in the safeguarding of those remaining and reforesting the cut-over lands and abandoned lands than we have done in the past.

So few men and women notice or even appreciate the gifts that nature has given us. Yet from the generous hand of nature there has been poured gifts of inestimable value. We are not only dependent upon them for our food but for our very existence. They fill our private purses and public treasuries. They shelter us from the sun and storm. They feed us when hungry. Adam Smith, Karl Marx and Henry George, famous economists and socialists, contended that all things came from Mother Earth and would in time return to Mother Earth. No product of nature is ever destroyed. Its physical form may be changed from a solid to a liquid, a vapor, or to energy.

In the early ages of civilization Nature molded her peoples. The folk of the tropics were indolent, lazy, given to weird religions and cults. The people of the far north were stolid, silent, hardy, and dependable. The folk of the plains, roving, nomadic, and fierce in battle. The people of the mountains, courageous, daring, indomitable, and thrifty. Even the forest lands stamped her children. They were fleet of foot, silent of tread, and noble in intellect. Our various dialects, languages, and color of our skins are a direct result of our original geographical homes.

The grass beyond the fence was greener, such was the excuse a cow gave for pushing down the fence and invading the next field. Those who live amid forests long for the plains. The majestic crags of the Rockies are thought commonplace by those who live among them. Little do they realize that those crags have molded them to their own likeness. We who live among the stately pine may long for the plains as a child reaches its hands for a new toy, but once transport one who has heard the sad wailing of the winds through the pines of evenings to those far western plains and those eerie sounds become as much once heard and still echoing through your mind.

We, who live among them, how little do we appreciate the gracefulness and beauty of our pines? Few of us stop to learn or think of their economic value in dollars and cents. We live among them, destroy them, yet never give a thought to their value. How few of us know that the number of products, which we use in our daily life, that are derived directly or indirectly from the commonplace pine.

Poets of all ages have sung their praises of our forests. Longfellow spoke of the Forest Primeval and likened Hiawatha in his manly beauty to a tall and stately birch. Even Omar the Singer, asked only to sit beneath the Bough with those other necessities and that would be happiness enow. Joyce Kilmer, the poet, who died at Chateau Thierry while in the Rainbow Division, wrote these lines just before his death:

"Poems are made
By fools like me
But only God
Can make a tree."

As Special Forest Ranger for Claiborne, Webster, and Bossier Parishes under the State Forestry Department and cooperating with the Federal Government, I wish to give in as few words as possible a view of what we are trying to do and our methods of going about it. True it is that we have millions of acres of forest lands in Louisiana, but if we are to continue to enjoy the material benefits from these forests as we have in the past, then we must strive to protect them. We must adapt scientific methods of reforestation and fire prevention as well as prevent indiscriminate cutting and wasting. Many thousands of acres have been reforested in Louisiana in the last few years. Watch towers have been built among our forests so that rangers could daily spot new fires should any break out in some isolated spot.

Fire and unsystematic cutting are the worst enemies to our forests. Fires are perhaps the worst of all. Still these could all be prevented if those who start them would see that they are destroyed before they leave their camp site. It is almost impossible to estimate the damages one carelessly left fire will do to a section of timber land. One small fire or burning cigarette stub may start a grass fire that will spread over countless acres of forest land, destroying many thousands of dollars worth of young pine. It takes at least a score or more of years for such a loss to be replaced by new growth such as was destroyed. The direct burning of the trees is an immediate and visible loss, but there are still other losses, one of perhaps more importance than we suspect. It is a known fact that where tree roots die, soil erosion sets in. The tree root acts as a binder for the soil. Once that growing binder is killed then torrents of spring rains soon furrow those barren lands. Again it is known that more rain falls over wooded areas. That is quite evident on the plains of western Kansas. More rain is falling there as cultivation of those wide plains spreads. It behooves us as citizens of Louisiana, to help in the safeguarding of our forests.

In keeping with the policy of the Federal and State Forestry departments, we are spending a great deal of time with the Boy and Girl Scouts. It is they who will tomorrow be the men and women of our state. It is they who will carry on the work of us, who are now working to preserve our forests. They, in the span of a few years, will see their children as Boy and Girl Scouts. So we feel no time could be better spent than the time we spend with them. I personally have found the Boy Scouts in my three Parishes to be a manly fine bunch of boys. They have given me whole-hearted cooperation and I feel sure that the time I have spent with them will repay the state many times. Since I have made their acquaintance, I intend to see more of them. In their scout work, they study trees and come to know their scientific and economic value. We need never fear that a Boy Scout will go away and leave his camp fire burning, even if he has no more matches. The Boy and Girl Scout movement deserves the united support of all of us. We older men have missed much by not having been Boy Scouts. I commend them highly for their help and the interest they have taken in their state and nation's fight to grow more trees and save what we now have.

"Familiarity breeds contempt." Those words were spoken by a famous English poet relative to crime, but we in the Forestry Department have come to realize that such is the case in regard to timber lands about us. Going a step farther. I have asked for and been given a very courteous reception in all of our schools. There I had the pleasure of reaching all of the boys and girls of today, the men and women of tomorrow. The schools in my district have been only too glad to do their part in helping us to conserve our forests. I have found the boys and girls ever ready to listen and help in this work. The various principals and teachers have been generous in adding their helpful remarks to mine and I'm sure within a few years Louisiana will rank second to none in her forestry work and even now she stands among the leaders in reforestation, low percentage in fires, and other forms of wasteful destruction. I have also visited the colored schools and stressed the value of our forests and the grave danger of fires. I can also commend highly the interest shown by the colored teachers and pupils in this worthwhile work. They promised faithfully to aid and cooperate with the various state officials and I feel positive they will do so.

No one could know the beauty of a tree and shaded road better than the American Legion boys, especially those who trod those beautiful tree-lined roads as they wound their way over the rolling hills of France. It was only natural that the Legion should sponsor a movement to tree-line the roads of Louisiana. It will take time to fulfill their program but a wonderful start is being made and it has given me great pleasure to have worked with them. I have assisted them in their first efforts, and I will be at their service at all times. Those boys, now men, who cheerfully went to serve their country, know the value of reforestation. They have seen many acres not only destroyed by fire, but also by shellfire. My work with the Legion has been pleasant, and I fully appreciate their cooperation with me.

To give statistics and precise information relative to the work being done in my three parishes might prove tiresome, but I wish to say that I will be only too glad at any time to give or send literature and information about my work or the work within the state.

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Louisiana Bullfrogs (Rana Catesbeiana)

By
Anna A. Casteix
Fisheries Division

THE growth of the Frog Industry in the State of Louisiana in the past few years, is chiefly attributed to the growing demand for the Louisiana "Jumbo Bullfrog," which attains such perfection in this State, and now recognized throughout the country as a food delicacy.

Nowhere in the United States can be found such a source of supply of this edible species of frog, as lies in that portion of Louisiana between the Mississippi River and its mouth on the east, the Sabine River on the west, and from the Atchafalaya River on the north to the Gulf of Mexico on the south.

The Louisiana Bullfrog (Rana Catesbeiana) is much larger than any of the other species of frogs. In size, this frog may reach from seven to eight inches in length, the hind legs not included; with legs stretched out, 15 inches; and averages about 1-lb. of meat per frog. Large bullfrogs average 1¾ pounds each; female bullfrogs are heavier in breeding season, weighing sometimes 2 to 3 pounds, at maturity.

The Bullfrog is often confused with the Green Frog (Rana Clamitans), which does not attain the size of the Bullfrog. The Bullfrog has no ridges down either side of its back. On its upper parts it may vary from yellowish green to a dark brown, while its under parts are yellowish white with some mottling. The throat of the female is whitish and the ears and thumbs considerably smaller than those of the male. Its meat is of finer quality than any of the other edible species of frogs.

They hibernate during the winter months and retire to the bottom of marshes, bayous and ponds and reappear during the early spring. The Bullfrog is reproduced by means of eggs. The female begins to lay in the third year, during the months of March, April, and May. They are very prolific, the female producing annually over 10,000 eggs. These eggs, in most cases, are laid in bottom lands, marshes, bayous, and ponds, sometimes they are found on stumps, logs, and brushes, and are left to be hatched by the heat of the sun. They are viscous and float on the waters. The body of the egg is soft and is encased in a capsule-like form. These eggs are hatched in about one week, and the tadpole grows very rapidly.

The Bullfrog and its offspring, the tadpole, are cold-blooded vetebrates. They are aquatic, but differ from fish, in having no fins.

They undergo a complete transformation while in the tadpole stage. Some tadpoles transform into young bullfrogs in the fall of the year, while others in the following spring, when about one year old. During severe droughts most of the tadpoles will transform in the late summer or early fall at the age of five to seven months. Drought influences them and causes transformation no matter what size they may be. During wet years there is practically no fall transformation. The tadpole consumes its tail during its transformation stage and this sustains life. The skin remains moist and affords respiration. Its external gills disappear and the lungs develop; its hind legs appear first, later the front ones grow, and the tail is finally absorbed. While these changes are taking place, nerves, bloodvessels and muscles are being formed, giving life and action to the new legs. The internal lungs take the place of the gills in the throat before the legs are fully grown and such tadpoles must rise to the surface to breathe. The tadpole requires two seasons to complete its development into a full fledged young bullfrog, and in about four years reaches full maturity and spawns for several successive years. Not less than two and a half years is required from egg to adult.

The value as food of the Louisiana "Jumbo" Bullfrog is now well established throughout the United States. Its meat is white and delicate, and not unlike chicken. It is a pleasant substitute for meat. During the years of 1930 and 1931—over 2,500,000 pounds of delicious frog meat were shipped by Louisiana Frog Dealers to all parts of the United States. Practically all Bullfrogs are shipped "dressed", and are sold in three sizes, "Jumbo", "Medium", "Small". A good part of the season's catch is shipped alive to biological laboratories for experimental purposes.

As the Bullfrog is nocturnal in its habits, hunting is carried on at night; the hunters using either carbide or small battery lights to "blind" the frogs, which remain mostly on the edges of bayous, canals, ponds or any small streams of water. After being "blinded", the hunter with great skill holds the light directly on the frog until he approaches the frog and picks him up with his hands, as it is against Conservation Laws to puncture the skin of the frog. However,

(*Continued on page 38*)

Northwest Louisiana Game and Fish Preserve

REPORT OF ENGINEER

By FRANK H. WADDILL, C. E.

[See Map on Pages 20 and 21]

OF the many splendid accomplishments of the Maestri Administration of the Department of Conservation, none stands out more boldly, nor appeals more strongly to nature lovers, than his successful creation of the Northwest Louisiana Fish and Game Preserve, out of Black, Clear, and Saline Lakes, in the Parishes of Natchitoches and Winn. Most men are by instinct, or heredity, coureur de bois, hunters and fishermen —some for profit, all for pleasure, so the creation of a hunting and fishing preserve of twenty-three square miles in extent is a thing to be applauded in the highest.

Black, Clear, and Saline Lakes, a little northwest of Natchitoches and west of Winnfield, have always been the hunter's and fisherman's paradise. It is probable that Juchereau de St. Denis, that beau-ideal of French Colonial tradition, founder of Natchitoches, the first white settlement in Louisiana, stalked the deer and called the turkey to gun range in these bottoms.

These lakes are now called lakes by courtesy, for they are lakes only in periods of high water. In the first part of the last century they were permanent lakes—made so by the backing up of the water by the great raft of logs in Red River. But the raft was removed, between 1833 and 1849, by Captain Henry Miller Shreve, founder of Shreveport, and the lakes drained out.

During all the years since the lake waters disappeared, hunters have hunted deer and ducks in the bottoms, and dreamt dreams of a great preserve.

The success of Cane River as a fish preserve, crystallized thought. Leaders arose, determined to realize this dream.

Conspicuous among them, were B. W. Bailey of Winnfield; J. W. Garr, of Dodson, formerly representative in the Legislature; Senator Lester H. Hughes, of Natchitoches; former Senator O. K. Allen, now Governor of Louisiana, of Winnfield; Representative C. B. McClung, of Natchitoches; P. A. Cloutier, of Campti; J. W. Payne, Sheriff, of Natchitoches; James P. Guillot, of Cloutierville, now Secretary of the Department of Conservation; and Huey P. Long, who needs no introduction.

Act No. 191 of 1926, fathered by J. W. Garr, created the preserve. This law did not supply sufficient funds, so nothing was done.

During the Long Administration, Senator Hughes and Representative McClung put through Act No. 69 of 1928, amending Act No. 191 of 1926, and providing sufficient funds, the universal lubricant for all machinery, the solvent of all difficulties, to do any and all things necessary to create, establish, and put in practical operation, the preserve.

Commissioner Maestri took up the project enthusiastically, had surveys made during 1930, and since then, has made every effort to acquire all lands to be covered by water. All state lands, therein, are, by statute, dedicated to the preserve. Mr. Maestri has taken the position that said lands have no real value except for what minerals they contain. Yet the owners must pay taxes. By donating the lands to the Commission, owners are relieved of taxes, and yet retain their mineral rights. Most of the owners have accepted these terms.

When so much of lake bottom had been acquired as to make certain the success of the project, plans for a spillway-dam were prepared, and on the 24th of September, 1931, a contract was let to the lowest bidder Fuller Construction Company, the same company which has built great concrete canals for the City of New Orleans, and the airport seawall for the Orleans Levee Board.

The design adopted was a hollow, reinforced concrete spillway-dam, a type which, for low levels, is comparatively cheap and exceptionally safe and stable.

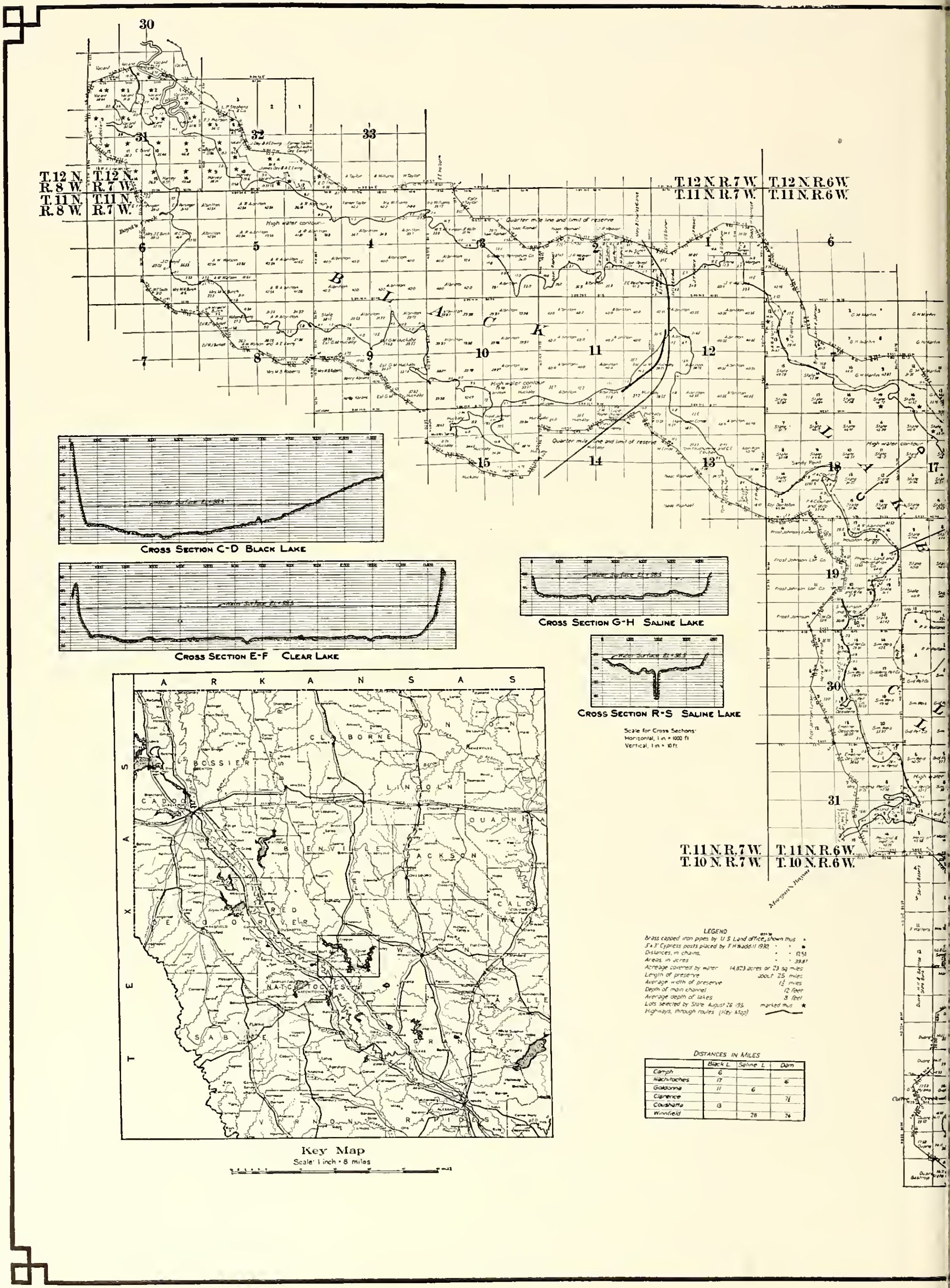
Its height is twenty-two feet six inches, and length two hundred and ten feet. It will cost about $35,000.00, exclusive of engineering fees.

Work began on the 4th of October, 1931, and progressed rapidly, due to exceptionally dry weather.

Heavy rains and a very high flood in Red River stopped work on the 16th of December, 1931, but is is expected to be resumed soon, and the job completed by June 1st of this year.

There are those who pretend to believe that the incomplete dam caused the water to back up

(*Continued on page 40*)



CROSS SECTION C-D BLACK LAKE

CROSS SECTION E-F CLEAR LAKE

CROSS SECTION G-H SALINE LAKE

CROSS SECTION R-S SALINE LAKE

Scale for Cross Sections:
Horizontal, 1 in = 1000 ft
Vertical, 1 in = 10 ft

Key Map
Scale: 1 inch = 8 miles

LEGEND

Brass capped iron pipes by U S Land office, shown thus •
3x3' Cypress posts placed by F H Waddill 1930 ●
Distances, in chains 12.51
Areas, in acres 39.37
Acreage covered by water 14,823 acres or 23 sq miles
Length of preserve about 25 miles
Average width of preserve 1½ miles
Depth of main channel 12 feet
Average depth of lakes 3 feet
Lots selected by State August 26 1931 marked thus ★
Highways, through routes (Key Map)

DISTANCES IN MILES

	Black L	Saline L	Dam
Camph	6		
Nachitoches	17		16
Goldonna	11	6	
Clarence			7½
Coushatta	13		
Winnfield		28	24

NORTH WEST LOUISIANA FISH AND GAME PRESERVE

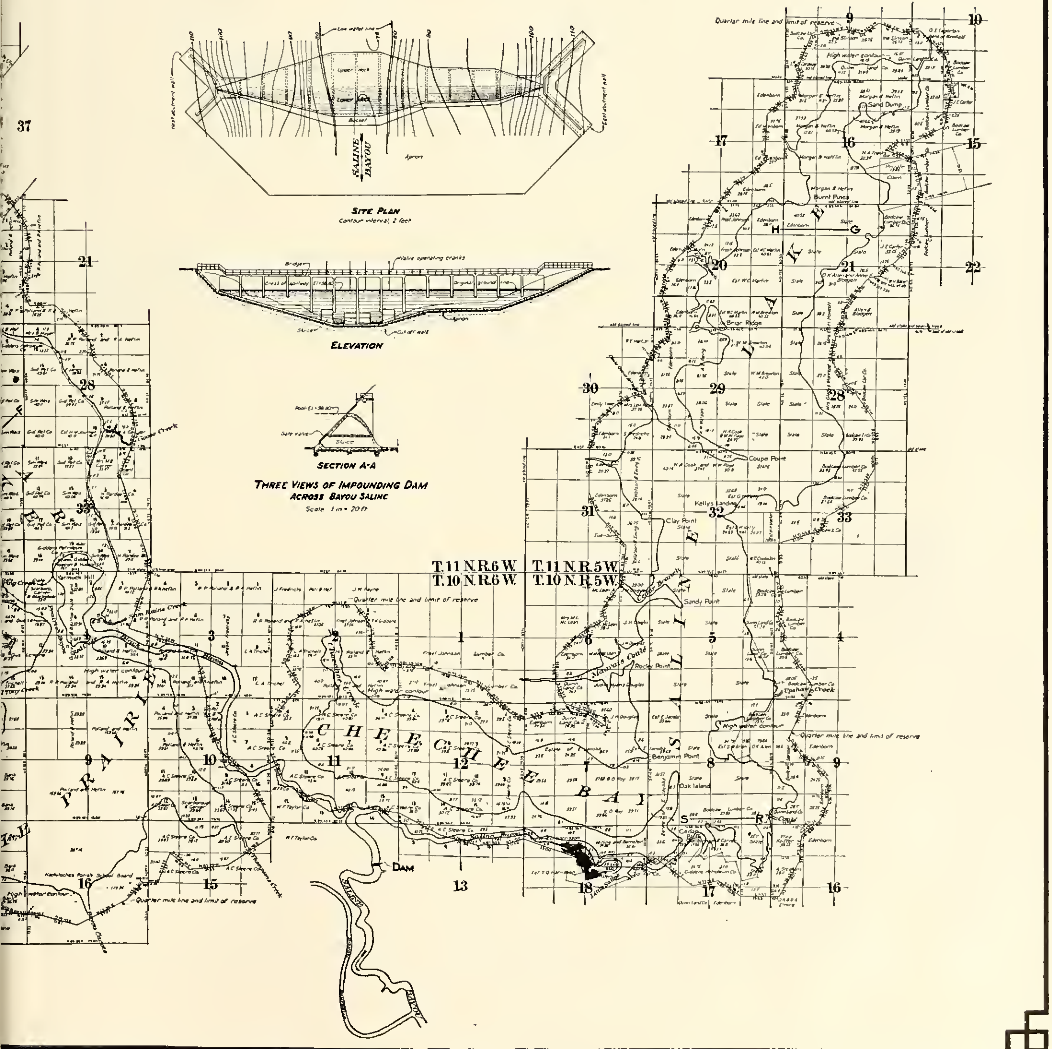
DEPARTMENT OF CONSERVATION
ROBERT S MAESTRI COMMISSIONER

FRANK H WADDILL
New Orleans

Scale 1 inch = 20 Chains

Drawn by Alston D Mugnier

August 1931



r Food

By JAMES N. MCCONNELL
Director, Oyster Division, Louisiana
Department of Conservation

ew
peop May,
June, July

Until recent very good reason why oysters were not recommended as a food, during these hot months. In times gone by, the oyster luggers, under sail, took several days to bring in oysters from the oyster reefs or beds. At times, when contrary winds were encountered, as much as four or five days time would elapse before the oysters reached the counter for consumption. Then, too, in those days, refrigeration facilities were lacking at the oyster counters.

1932			MAYOR			1932
SUN.	MON.	TUES.	WED.	THUR.	FRI.	SAT.
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Today, the luggers, under power, transport oysters from reefs or beds to oyster counters in the city, in from six to eight hours, and with the improved refrigerating facilities that exist at present, oysters sold by any of the reputable dealers are recommended as a safe hot weather food. In fact, they may be shipped to any point in the state, under proper refrigeration and eaten safely.

1932			JUNOR			1932
SUN.	MON.	TUES.	WED.	THUR.	FRI.	SAT.
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

Another fact which influenced against the eating of oysters during the months without an R in them was, that, this was the breeding season for the oysters. During this time, oysters contained a milky substance of peculiar taste that most people found unpleasant. By the improved scientific handling of oysters, this possibility has been eliminated. Today the oyster fisherman selects oysters from a reef or bed where they have completed the breeding process or have not as yet begun, owing to the differences in salinity and temperature of the water along our coast.

Today there is no reason why oysters should not be eaten during the months of May, June, July and August, and there are many reasons why they should.

So deep-seated has been the erroneous conviction of people that they must not eat oysters during these months that we, in the following paragraphs, are putting an R in May, June, July and August, and we ask readers to refer to this calendar when contemplating the eating of oysters. Each R stands for a *Reason* for eating oysters in hot weather.

R FOR REDUCE

EAT RAW OYSTERS AND REDUCE

Instead of the usual mid-day meal, order for your luncheon just as many raw oysters as you wish, eat them with all the usual condiments, but eat as few crackers as possible. Have your breakfast and dinner as usual, but try the raw oyster luncheon for two weeks. Weigh yourself before you start, and at the end of two weeks, and you will be surprised at the weight you will have lost, and how good you will feel. You will suffer none of the hunger pangs or that weak giddy feeling so attendant upon the usual diet. The raw oyster luncheon diet will give you that filled, satisfied feeling without the resultant indigestion, or that heavy, sleepy feeling which follows the usual heavy midday meal; in other words, you can reduce in comfort.

1932 JULYOR 1932

SUN.	MON.	TUES.	WED.	THUR.	FRI.	SAT.
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

R For Repose

EAT RAW OYSTERS FOR DINNER, AND HAVE NO SLEEPLESS JUNE NIGHTS

During the hot nights of June, after a heavy dinner, you have gone to bed unable to sleep. You have pitched and tossed, walked the floor, counted the sheep going over the fence, and yet been unable to sleep. You have arisen in the morning more tired and worn out than when you went to bed, and all day you have been in a bad humor with the whole world. This sleeplessness is caused in many cases by our digestive organs struggling to properly digest a heavy dinner we have eaten. Would you like sweet restful repose during the hot June nights? Then, have a dinner consisting in its entirety of raw oysters. Eat as many as you please, with the usual condiments and crackers. You will go to bed and sleep that sound, restful sleep, and awaken in the morning refreshed, happy and good-naturad enough to smile at your Mother-in-law.

1932 AUGUSTOR 1932

SUN.	MON.	TUES.	WED.	THUR.	FRI.	SAT.
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

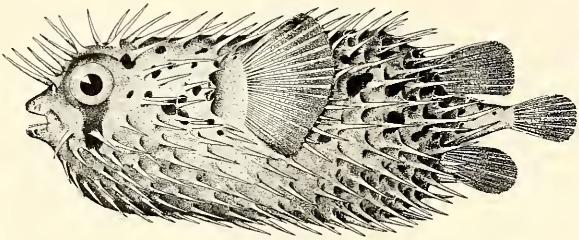
R For Repast

You can enjoy a lovely repast, yet your wife will not have to stand over a hot stove. This repast, ice cold raw oysters, with crackers, washed down with iced tea, on, say, two nights of the week, you will find a very welcome, healthy, substitute for the heavy, hot cooked dinner. Eat as many raw oysters as you wish, and notice, the change in your wife's disposition. A woman who has not spent some time on a July night leaning over a hot stove, is certainly less apt to nag or fuss, after serving the meal described above. Just think, a healthy substantial meal of raw oysters and iced tea, and a wife in a good humor.

EAT OYSTERS AND REBUILD THE RED CORPUSCLES OF THE BLOOD

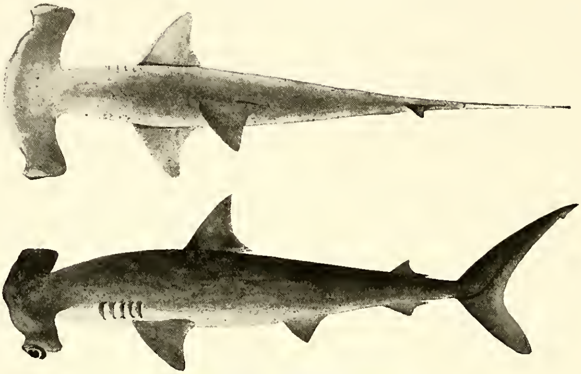
That tired, worn out feeling when you have to drag yourself around is caused in many cases by a run down blood system. The corpuscles of the blood need rebuilding ever so often. It is a scientific fact that the raw

(*Continued on page 38*)



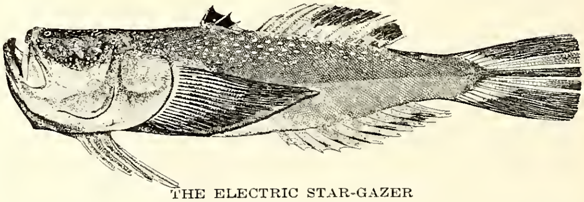
THE PORCUPINE FISH
(*Diodon hystrix*)

Armed with sharp, strong spines, this grotesque species is often dried and made into Japanese lanterns. In life, its color is olive, spotted with black. It is one of the many typically tropical fish to be found along the Gulf Coast. It sometimes reaches a size of two feet.



THE HAMMER-HEAD SHARK
(*Sphyrna zygaena*)

One of the strangest of all fishes, the Hammer-Head Shark, has its eyes placed at the sides of its T-shaped head. The usefulness of this extraordinarily shaped head is not yet clear. The Hammer-Head, like the Bonnet-Head, bears its young alive and may produce as many as thirty-seven in a single litter. Unlike the Bonnet-Head, it often attains large size. Seventeen foot specimens weighing fifteen hundred pounds have been captured. Although its teeth are small, it is a voracious shark and occurs widely in the warm seas of the world from Cape Cod to Gibralter and from California to Japan. It is one of the many sharks found in the Gulf of Mexico.



THE ELECTRIC STAR-GAZER
(*Astroscopus y-graecum*)

This species, reaching a length of about fifteen inches, is to be found along the Gulf Coast. It is remarkable in appearance and gains its name from the odd position of its eyes. On the upper side of its head behind and below the eyes are two electric organs which even in fish of only six inches total length can give an appreciable shock. The Star Gazer often is buried in sand and mud with only its eyes and mouth exposed. A full grown Star-Gazer is just about one foot long.

Queer Fish Found in Gulf Are Sometimes Too Fantastic for Belief

Rays and Mantas Worse Than Local Sharks, Seahorse Looks Like Siren But Is Devoted Father and Torpedo Makes Own Electric Light

By WARREN C. OGDEN

MANY of the almost incredible tales fishermen bring back from expeditions off the Louisiana coast are given scientific corroboration in a bulletin just issued by the State Department of Conservation. In the bulletin are descriptions and photographs or sketches of a score of the bizarre fish that skeptical friends of anglers usually consider mythical.

In the semi-tropical waters of the Gulf of Mexico there really are whale sharks that will tip the scale at some 10 to 12 tons, there actually are devilfish or sea devils that measure 22 feet from tip to tip and there unquestionably are electric stargazers that generate in their bodies enough current to give an appreciable shock to an assailant, the bulletin asserts.

Prepared by James Nelson Gowanloch, chief biologist of the department, the 187-page bulletin is entitled, "Sea Fishes and Sea Fishing in Louisiana." In addition to accounts of bizarre sea creatures, the book includes a large assortment of valuable information on the subject of fishing.

LAWS AND RECIPES GIVEN

Illustrated profusely, the work includes a summary of the fishing laws of Louisiana, directions concerning how to preserve specimens and 50 pages of recipes for cooking sea food. While one section of the bulletin is devoted largely to game fishing, another takes up in detail the fish caught principally for food.

Among the strangest sea animals found on the coast of Louisiana are the rays and the great mantas or devilfish. While sting rays, which are capable of inflicting painful wounds with their sharp spines, are well known, their large kinsman, the sea devil, is encountered only on rare occasions, the bulletin points out.

Sting rays, like whip rays and eagle rays, defend themselves with spines, which fishermen generally believe are equipped with poison. The bulletin suggests that the view seems justified by the extraordinary pain caused by the wounds. The spotted whip ray, found widely in Louisiana waters, is equipped with "a most unusual arrangement of teeth resembling a powerful mill, the upper and lower plates of which are composed of closely set, flattened teeth." Thus armored they can actually chew up clams and other shell fish, shell and all.

SEA DEVIL POWERFUL

The most powerful of all the members of this family of flat fish is the sea devil, specimens of which weigh as much as two tons. "This monster can become a dangerous animal when harpooned from a small boat. Repeated instances have occurred in which the fishermen's boat was towed for hours by this powerful creature. Graceful in movement, in spite of their size, the mantas usually swim so close to the surface that the upturned points of their wings break water and display the white under-surface. Schools of these strange fish are frequently encountered along the borders of the muddy water where the Mississippi pours into the Gulf through South and Southwest Pass."

Both the electric ray and the torpedo ray are found in Gulf waters and both have the power of giving severe electric shocks.

"The larger of these, the torpedo, reaches a weight of over 200 pounds. Its 'electric organ' is a large honeycomb-like structure located between the head and the pectoral fins and composed of over 400 cells filled with a clear, jelly-like substance. The 'electric organ' is really a greatly transformed muscle. Although its shock is not dangerous, an encounter with the torpedo can be a severely painful experience," the bulletin states.

STARGAZER ELECTRIFIED

Another Louisiana fish that, although completely unrelated to the rav family, is equipped with an "electric organ" is the southern stargazer. The organ in this case is not a transformed muscle but a transformed optic nerve. "The stargazers' small electric cells are carried under the naked skin of the back of the head. It receives its common name from the position of its small eyes which, placed on top of its head, seem to stare constantly at the stars."

While relating almost incredible tales of sea animals, the author of the bulletin not infrequently stops to explode old and unfounded legends. In one of these interims he brands as "pure fiction" the stories about spectacular fights between sawfish and whales.

"This strange member of our marine fauna," he writes of the sawfish, "is really a ray. The shark-like sawfish has the snout prolonged into a very long, strong, flat blade, on each side of which are socketed enameled teeth. Sawfish chiefly inhabit tropical and semi-tropical river mouths, and it is believed that they make use of their formidable saws in attacking the schools of sardines and mullets, upon which they feed. . . . The sawfish is recommended as a good pan fish when young, while steaks cut from large individuals are also said to be excellent . . . Nineteen-foot specimens of the Gulf variety of sawfish are recorded."

FREAK FORMS DESCRIBED

Among the bizarre animals of the sea, illustrations of which are shown in the book, none are more freakish than the cowfish and the batfish. Not only is the cowfish remarkable for its Hallowe'en face, but it also has structural features which differentiate it from other inhabitants of the sea. Its body is protected by an armor of fused scales forming a bony box with only the jaws, fins and tail free to move. It gains its name from the small horns in front of its eyes. When full grown it is about a foot in length.

Although batfish are frequently taken by shrimp trawlers on the Louisiana coast, they never fail to elicit wonder when they fall into the hands of persons who have never before seen them. Their flat bodies are covered with spine-like scales and their widespread fins are frequently used in walking along the bottom.

The porcupine fish, armed with sharp, strong spines, is another of the grotesque inhabitants of the Gulf. The menacing armor from which it derives its name covers the entire body, which is olive in color marked with black spots. Not infrequently in these waters it reaches two feet in length. In Japan these fish are dried and their skins, almost like shells, are made into lanterns.

FLOUNDERS QUITE HANDSOME

"Handsomest of all our flat fishes is the little flounder which is common along the Gulf coast." The flounder, used widely in this section as a food fish, measures about 15 inches in length when grown. The bulletin includes a series of illustrations showing the stages by which a young tonguefish changes from the conventional form to that of a flatfish having both eyes on the same side of its body.

The Southern swellfish is another unusual sea animal discussed by Mr. Gowanloch. Seldom more than a foot in length, this fish has a novel method of puffing itself up by swallowing air or water until it becomes grotesquely globe-like. It is believed that the strange behavior is to discourage enemies.

"It is probable that some half dozen or more species of swellfishes may be found in the Gulf of Mexico off our coast. The tiny eggs of swellfishes stick to anything they touch, and hatch into the usual transparent fish larvae which, by the time they are only one-fourth of an inch long, have already acquired the ability to puff themselves up like their parents, floating like grotesque, bouyant peas. . . The capacity of the swellfish to puff is relatively large, since a fish only eight and a half inches long can swallow 40 ounces of water."

SEAHORSE DISTINCTIVE

Frequently found in Louisiana waters and yet invariably a source of interest is the Southern seahorse. It is closely related to the pipe fishes and yet completely unlike them in appearance.

"Of uncanny shape and even stranger habits, the seahorse looks like a mermaid or the fantastic creation of a medieval artist. Only about five inches in length, it swims vertically in the water and winds its tail around the seaweeds to which it clings." He is a kind father, the male having a brood pouch in which the eggs are carried until they hatch.

"Sharks, because of the ferocity that tradition has provided for them, are fishes of unusual interest. In Louisiana waters, many different varieties of sharks and their relatives, the skates and rays, are found, among the commonest being the spot-fin ground shark, while the most unusual in shape is probably the hammerhead shark. Of all the sharks, one alone appears an authentic danger to bathers, the so-called man-eater or white shark, which has been known to attain the length of over 40 feet. Fortunately it is nowhere numerous."

The basking shark, largest of the family,

(*Continued on page 37*)

Louisiana Nature Guardians

"Upon my honor, as a Louisiana Nature Guardian, I promise to take care of all our natural friends, to guard and protect them to the best of my ability, and as far as possible influence others to do the same."

ESTELLE VERJIE COTTMAN, *Editor*

WHEN the Nature Guardian Club of Louisiana was formed several years ago, it met an instant and hearty response from the teachers and the school children all over the State. From a small interested group it has grown steadily into a mighty force of thousands of young conservationists. These children are the proud possessors of handsome lithographed badges, and certificates of membership. New Clubs are being formed each week and it is the purpose of the Educational Bureau to enroll every Louisiana boy and girl, white or colored, under the Nature Guardian banner.

HOW YOU CAN BECOME A NATURE GUARDIAN

YOUR PART

Consult your teacher.

Ask that the purpose and plans of the Nature Guardian Club be explained to you and the class.

Ask for an application card.

Get a responsible person to indorse it, after proving that you fully understand the duties of a Nature Guardian.

Sign the application and mail the card postpaid, or give to your teacher, to send with cards from all the class.

OUR PART

We send the application card.

We send you a handsome badge, a certificate of membership, Nature Guardian pamphlets and other literature.

This is all free, and is carried on with the purpose of instilling in the children's minds a knowledge of Louisiana's wild life and a thorough understanding of its economic value to the State.

It also aims to develop individual humanitarianism. Even within this short time an amazing improvement has been made in the mental attitude of our young folks toward the conservation and protection of Louisiana's natural resources.

EDITORIAL

MY DEAR GUARDIANS:

Have you read your Club pledge recently? Really, it is a beautiful and serious promise of loyalty and kindness, and should be kept in mind at all times. It is not an empty form of words. but a happy expression of the high ideals towhich all true Guardians should aspire.

What a privilege is yours who are the youthful defenders of our woods and streams! Through your love of birds and trees springs your sincere desire to protect them. Wild creatures and plants already are enjoying a new safety and protection because of your loyalty to your pledge.

You gain enormously by your contact with nature. You are made beauty conscious and conservation minded. You develop in yourself a new feeling toward God's birds, trees, flowers, and furry creatures of the woods.

Here are some reasons why all Louisiana boys and girls should wish to become Nature Guardians:

I WANT TO BE A NATURE GUARDIAN IN ORDER THAT I MAY:

(1) Study nature and conservation at every opportunity, direct from nature, whenever possible.

(2) Learn the nature of the soil and the means of conserving and upbuilding it.

(3) Protect the forests, especially from fires; use wood intelligently, and plant trees.

(4) Learn to distinguish between beneficial and harmful insects, reptiles, etc., and not knowingly destroy any creature unless it has been positively proven by scientific study to be dangerous or destructive. Disprove much superstition in the State regarding many beneficial creatures but very little of it has any foundation in fact.

(5) Learn to recognize, protect and encourage the birds, the best friends of humanity, all of which, except five species, are classed as useful. Plant shrubbery, build bird houses, feeding stations, and baths, and do not burn or otherwise destroy cover.

(6) Observe the game laws. Shoot only legitimate game in open season. Kill only such as can be used as food and do not be a game hog.

(7) Protect the streams and keep them free from pollution.

(8) When angling keep such fish as are large enough for food and return all young fish to the water. When catching bait, or seining, retain only what is actually needed and return the balance of the catch unharmed to the water from which they were taken.

(9) Protect wild flowers and teach tourists, picknickers, etc., to leave them alone in order to prevent their extinction so that they may be enjoyed by all.

(10) Preach conservation, as well as practice it by warning men and boys who violate conservation laws or policies, and ignorant or thoughtless people.

Yours, with much love,
THE EDITOR.

Here are three contributions from 5th grade pupils of the Elton School. We are sorry that we cannot print all the good things sent to us and wish to thank the teacher for her letter and hearty cooperation.

THE PELICAN

O Pelican, O Pelican,
What makes your beak so long?
You work and toil from morn till night
And never sing a song.

O Pelican, O Pelican,
Please don't let me alarm you.
You know I shall not harm you.
You're not a bird of beauty,
But just a bird of duty.

DAN NORRIS
5th Grade, Elton, La.

A RIDDLE

I am a funny little animal about twelve inches long, and my tail is about ten inches long. I live in a big hole in the ground that opens into the water. It is large enough for my little babies.

My home is made to sleep in. I am careful enough to wash my food before I eat it.

My enemies are alligators, snakes, and minks.

I am found along the Coast.

I am very important, because I make warm coats for people.

Who am I?

EVA BULLER
5th Grade, Elton, La.

A RIDDLE

I am Louisiana's best known tree.
I grow very slowly.
I make a good shade.
My branches are wide-spreading.
My acorns are small and light brown.
I always stay green.

There are some trees in Louisiana like me that are nearly one thousand years old.

They are many feet in circumference.

Guess who I am!

MYRTLE DOISE
5th Grade, Elton, La.

Colfax, La.

Nature Guardian Club,
New Court House Bldg.,
New Orleans, La.

DEAR EDITOR:

I just received my book from you, and surely was glad to get it. Now I am sending you a poem about the mocking bird and I hope you will like it,

"THE MOCKING BIRD"

There's a mocking bird, so friendly and gay
That sits on my house singing day after day.
I'll tell you now what he seems to say:
"I love the children, and I love the pine tree,
And I love all who are kind to me.
Chat! Chat! chee! chee!"

I love his voice that sounds so sweet
I love his dress so trim and neat
I love to hear his voice repeat:
"I love the children, and I love the pine tree,
And I love all who are kind to me.
Chat! Chat! chee! chee!"

It's the sweetest song I ever heard,
Oh, how I love the mocking bird!

Do you know why I wrote about the bird? It is because he stays on top of my house day in and day out. When he flies he seems to say he'll be back soon, and when he comes back he goes to the fence to sing me a song.

Your Guardian,
(Signed) EVELYN.

Evelyn did not give her full name, but perhaps she'll write again sometime soon, and tell us.

116 N. Tonti St.
City.

Nature Guardian Editor
Department of Conservation
New Court Building
New Orleans, La.

DEAR SIR:

I have written a poem, which I hope you will print. It is as follows:

THE REVIEW

One day I saw a magazine,
With many a beautiful scene
And I will tell to you,
The name of this review.

Louisiana Conservation is the name
And now, me, you cannot blame
When I say I have seen
Many a beautiful scene.

First I saw the forests
With its many bird nests,
Then the birds in the trees
That twittered in the breeze.

Next the very large oysters
Escorted by the lobsters
Came into my sight
On that lonely night.

As I neared the end of the book,
At the museum did I look.
And last, but not least,
The products of west and east.

Hoping that my above poem meets with your approval, I am,

Respectfuly yours,
ALBERT J. LUICCHESI, JR.
Age 12

We are glad that you like our magazine so much. We try to make it better each month. Our motto is, "Lifting Better Up To Best."

WINGS

I only wish that I had wings—
Then I could do all kinds of things.
I'd fly above the clouds up there
And dive and slide around the air.

I wouldn't hear my mother call;
I wouldn't go to school at all;
I'd be so high they couldn't see
Or even guess that it was me.

I'd fly around the moon and stars
And see the people up on Mars.
I'd pay a visit to the sun.
Oh, say—I'd have tremendous fun!

Why wings would take me everywhere—
Gee whiz! I wish I had a pair!

Nature Guardian Club,
Department of Conservation,
New Orleans, La.
DEAR EDITOR:

I live in Louisiana and am eight years old. I am a member of the 4th local Club. I would like very much to belong to your Club. Please send me an application blank and I will return it soon.

Yours very truly,
LILLIAN MONTGOMERY.
Delhi, La.
Box 126, Route 1.

A MEMORIAL TO LOUISIANA

The pines of Louisiana
Cypress and hard wood, too,
Louisiana's foundation for wealth
And they all belong to you.

So why not take advantage
Of the things afforded you?
Conserve the stately pines and oaks
For they all belong to you.

They furnish wealth, and fuel, and home
And shed the winter's wind,
And to birds and animals
They have always been a friend.
So, if I could choose just one resource
And to our State could give,
It would be the stately pines and oaks,
A memorial that forever lives.

—EDWIN ENLOE.

With this little poem from Edwin, we will close our column for this month, with a heartfelt welcome for all our new Guardians.

We shall be glad to hear from our members at any time, and shall be glad to print their poems, themes, and letters about any of the natural resources of Louisiana. We hope that our next issue will contain many interesting articles by members of our Club.

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THE MANTA

(*Continued from page 5*)

writer has frequently observed Sharks turn upon and tear to pieces a wounded member of their school. The degree of intelligence of a Manta is presumably closely similar to that of a Shark as they both belong to the same group, the Elasmobranch Fishes. It is perhaps, therefore, equally unsound to ascribe such touching conjugal affection to either Sharks or Mantas.

The size of the captured Manta, as indicated above, was nineteen feet eight inches across and eighteen feet nine inches from head to tip of tail. The weight that the captors estimated for it was in the neighborhood of 5,500 pounds. To the writer, this figure seems rather high since specimens of Manta, measuring twenty-two feet across, have been known to reach a weight of somewhat over 3,000 pounds. However, reference to the available accounts indicates that the maximum weight may be enormously greater, thus Meek and Hildebrand, in their valuable "Marine Fishes of Panama," state "Some members of this family reach an enormous size. It is said that individuals have been taken which were twenty feet wide and weighed more than four tons." Thus the 5,500 pound estimate for Captain Gould's specimen lies far below the 8,000 pound figure given for a Manta of almost the same dimensions. It should be noted that in a fish of such flattened form as the Manta, two individuals of the same length and breadth may vastly differ in weight since upon attaining a maximum length the individual may acquire a vast bulk, through a development of thickness of body, without a growth in length or breadth, just as human avoirdupois is not necessarily a matter of height.

The Great Manta is a well known member of the sea fauna along our Louisiana Coasts. The writer has encountered groups of these impressive fishes swimming along the surface of the sea off the mouth of the Mississippi River. The near presence of the research vessel of the Department of Conservation seemed in no way to alarm them as they went slowly past.

Mr. J. M. McConnell, Director of the Oyster Division of the Department of Conservation, has given the writer an account of an experience he had with a Manta. On July 21st, 1930, Mr. McConnell encountered a school of these fishes at Taylor's Island Pass, a place where throughout the month of July they are usually common. He states that there were between thirty and forty of these animals in the neighborhood and one of them the boat purposely struck. Mr. McConnell shot the Manta twice with a twelve gauge shotgun and the blood spurted conspicuously from the wound. After working at the animal for one hour, he transferred to the small boat, shot the animal three times more and repeatedly endeavored to gaff the animal with a large fish hook, the only instrument available. The skin proved to be too tough and after further attempts he finally abandoned the project of securing it. He estimated the spread of this specimen at between fifteen and eighteen feet.

Mantas have a wide distribution in the warm waters of the world, ranging from Brazil to New Jersey and from Jamaica to Japan. In a recent publication of the Oceanographic Laboratory of the Canary Islands, "Nota Sobre los Peces Elasmobranquios de Canaries," by L. B. Uriarte and E. B. Mateu, (Instituto Espanol de Oceanografia, Notas Y. Resumenes, Serie II, Numero 53, 1931) there is an interesting account of the capture and study of a specimen of Manta of the European species from which was taken an embryonic young, ready for birth. Mantas, like many Sharks and Dogfish, bear their young alive.

Little indeed seems to be known of the fundamental natural history of these strange sea beasts. Provided, as they are, with unusually small, flat, tubercular teeth, it would seem that they would be incapable of successfully attacking large prey. The slight evidence available seems to indicate that Mantas may feed chiefly upon shell fish and other inhabitants of the sea bottom. The amount of food necessary to support an individual weighing four tons must be appalling, even though the movements of the animal may be sluggish and its metabolic requirements consequently low.

Discussion of Mantas immediately brings to mind the interesting problem of the maximum size attained by sea animals. Reference to several authentic living sea monsters may be worth while. Certain very slender sea worms, known as the Nemerteans, have been reported to reach a length of as much as eighty feet but these animals are exceedingly slender.

One of the most impressively large invertebrates, the mysterious giant Squid, *Architeuthis princeps*, is in form, closely similar to the ordinary sea Squid. Its size is spectacular. From its nine foot body there extend arms which have been known, in captured specimens, to reach a length of thirty-seven feet and bear great numbers of suckers, each the size of an ordinary teacup. It is easy to imagine how overwhelming would be the experience of a fisherman alone in a skiff at sea were one of these giant Squid suddenly to rise near him and stretch its arms, a writhing spread of over seventy feet.

Among the giants of the fishes are certain Sharks. The Basking Sharks, sluggish sea beasts, have been reported to reach over forty-five feet in length while a species of another Shark group, the Whale Shark, *Rhinodon typicus*, ranging from the Cape of Good Hope to the Gulf of Mexico and from the shores of California to the Coast of India, has been known to attain a length of thirty-eight feet and a weight of 26,594 pounds. Dr. Gudger, in a recent number of Science, has reported the capture of a fifth specimen of Whale Shark in Florida. None of the five specimens which he has recorded reaches the maximum size known for the animal, the lengths being respectively, 18 feet, 32 feet, 31 feet, 31½ feet and 18 feet.

The greatest of all sea animals are not to be found among the fishes, but among those strangely modified mammals, the Whales. Indeed, as Starks has said in his "A Short History of California Shore Whaling," (1922), a Sulphur-bottom Whale or Blue Whale, as it is also called, "is not only the largest animal in existence, but is probably the largest that ever has existed." The Blue Whale has been known to reach a length of ninety-five to one hundred feet and a weight of over ninety tons. Kellogg, in his instructive paper on "Whaling Statistics for the Coast of North America" (Journal of Mammalogy, 1931) has assembled much data concerning these great sea creatures. Included are the measurements and studies of sixteen hundred and eighty-three Whales, conducted by the staff of the Marine Biological Laboratory at King Edward's Point, South Georgia, near the southern tip of South America. Seven hundred and eighty-five of these were Blue Whales. Dr. Kellogg points out that the Blue Whale measures, at birth, twenty-three feet and in seven months, during which it is fed only upon its mother's milk, this twenty-three foot baby proceeds to attain a length of fifty-eight feet six inches. When only two years old, and now a sexually mature adult, the Blue Whale has reached an average size of seventy-four feet two inches for the males, and seventy-seven feet nine inches for the females. The chemical transformations and biological energy exchanges involved in the building and the maintenance of this vast machine are made all the more amazing by the fact that many species of whales feed exclusively upon minute food.

The Bureau of Research of the Department of Conservation is anxious to secure the detailed records of the capture of Mantas and other unusual animals so that these facts of such wide interest may be assembled and made permanently available.

REPORT OF BUREAU OF SCIENTIFIC RESEARCH AND STATISTICS

(*Continued from page 15*)

tions drawn up for the exact problem or must be secured from scientists, often from distant countries, who are specialists in the design of such instruments. The Bureau of Research has concurrently built up a well equipped chemical laboratory for the conduct of the innumerable experiments and analyses it is called upon to perform in relation to the Shrimp Investigation. The research vessel has been supplied with the most effective working equipment for the performance of the researches at sea, so that the results obtained will fulfill the high standards of precise scientific work.

The Bureau of Research has further engaged in the accumulation of data from all sources covering the wide field of its responsibilities so that the immense variety of problems which come to it from the citizens of Louisiana can be given solution. Some indication of the character and diversity of these problems has been given elsewhere in this report.

The Bureau of Research has earnestly attempted to build up an adequate reference library covering the most important matters involved in its work. The need for such a source of accurate up-to-date information is obvious and much has already been done to meet this necessity.

Further, the question of establishing and conducting a library for the Conservation Department wherein all library material of the Department may be kept, thus doing away with partial libraries in each division, has been investigated, and recommendations on this subject will be made to the Commissioner within a short time.

PERSONNEL OF THE BUREAU OF RESEARCH

At present the personnel of the Bureau of Research and Statistics consists of

Colonel Hu B. Myers, Director.
Mr. J. N. Gowanloch, Chief Biologist.
Mr. Forrest V. Durand, Assistant Biologist.
Mr. George Adams, Captain of the *Cormorant*.
Mr. H. Bruning, Engineer of the *Cormorant*.
Mr. Henry Denapolis, Cook of the *Cormorant*.

INVESTIGATION OF DISEASE AMONG WILD LIFE

Arrangements have been made with Dr. Joseph D'Aunoy, pathologist at Louisiana State University Medical Center, for his cooperation in the pathological examination of specimens of wild life suspected of disease infections.

Development of Conservation Sentiment[*]

Abstract from United States Oil Policy

By JOHN ISE

BEFORE proceeding further with this question, it will be pertinent to point out just what we mean by "Conservation," and on what philosophical basis we demand such a policy. This subject has been ably treated by Professor L. C. Gray, by President C. R. Van Hise of the University of Wisconsin, and by others, and must be briefly reviewed here.

As Professor Ely has said, "Conservation means a sacrifice of the present generation to future generations, whenever it is carried far, this conflict beginning far before the ideal is reached which conservationists are inclined to advocate." Professor Gray likewise finds, "the real heart of the conservation problem" in "the conflict between the present and the future." "The primary problem of conservation expressed in economic language," he asserts, "is the determination of the proper rate of discount on the future with the respect to the utilization of our natural resources."

We need not philosophize too much, however, as to just how much we may properly discount future uses of oil. It is entirely safe to say that when we refuse to consider the wants of future generations at all, we are discounting at too high a rate. We probably have a right to prefer our thousandth joy ride to that of our grandchildren, but whether we have a right to deprive them of their only ride in order that we can indulge ourselves with two thousand such rides is another question.

Clifford Pinchot, the greatest figure in the Conservation Movement in America, has, of course, written much, and the following seems pertinent: "What should any of us say of a man adrift at sea in an open boat with a little barrel of water, enough water to last him with ordinary use, for five days, and he knew that the chances of being picked up at sea were infinitesimal, he was out of track of ships, and he knew the best time he could make, it would take twenty days to reach land, what should we think of that kind of a man, if under these circumstances, he not only drank all the water he wanted, but used the rest of it to wash his hands?"

Conservation views regarding oil were rather late to appear, largely because oil was not an important resource until after the Civil War. Donaldson's Public Domain, published in the early eighties, does not even mention it. The conservation of coal was an important topic in England early in the nineteenth century, and in Pennsylvania the approaching exhaution of anthracite was discussed before the Civil War; but oil received relatively little attention until 1900 and after.

There were, nevertheless, some expressions of concern for the future oil supply almost from the first. In October, 1861, a writer in the *Derrick* reported: "Fears are entertained that the supply of oil will soon be exhausted if something is not done to prevent the waste. In 1861, R. W. Raymond, Commissioner of Mining Statistics, in his report on the mineral resources of the States and Territories west of the Rocky Mountains, pointed out that mining is different from agriculture, in that it is taking part of an irreplacable resource.

At the annual meeting of the American Institute of Mining Engineers in February, 1882, Henry Wrigley read a paper in which he estimated the amount of oil remaining in Pennsylvania and New York at 96,000,000 barrels. In closing, he voiced the following warning: "We have a certain fixed quantity of oil placed to our credit in the Bank of Nature, on which we have been drawing checks for twenty years, in 1875 we were checking out six millions, and in 1882 we are checking out twenty-five millions annually. Some day the check will come back endorsed 'No Deposit' and we are approaching that day very fast."

In the nineties the exhaution of oil supply was a common subject of discussion in California; but the rapidly increasing production of 1901 and 1902 stopped the discussion for this time. In January, 1904, C. T. Deane wrote very cheerfully of the outlook, "The permanence of the supply of oil need not trouble this generation." Some writers, however, say that oil men were drilling too many wells; and in all parts of the country, there were many signs of an increasing interest in Conservation.

In 1907 and the years following interest in the general subject of conservation developed very rapidly under the influence of Gifford Pinchot and Roosevelt. In a message to Congress in February, 1907, President Roosevelt gave particular attention to the question of conservation.

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[*] Compiled by Clarence P. Dunbar, Paleontologist, Minerals Division of Department of Conservation.

A gradually developing appreciation of the value of oil resources, and of the necessity of at least avoiding unnecessary waste, is shown by the history of legislation. Laws against waste of oil were enacted first in New York and Pennsylvania, where as early as 1879 and 1881, legislation was enacted regulating the method of plugging abandoned oil wells, to prevent water from reaching the oil bearing sands. Legislative laws were made in various States to conserve oil and gas resources as follows: Indiana in 1889; West Virginia in 1891; Kansas in 1891; Texas in 1899; California in 1903; Illinois in 1905; Wyoming in 1905; Arkansas in 1905; Louisiana in 1906; Oklahoma in 1909; and Nebraska in 1917. Thus most of the oil States have shown some interest in the conservation of oil and gas. Some of the laws have merely prohibited waste. Some have a fixed time within which new wells must be controlled, and the time permitted has varied from two days to three months. Many of the laws have prescribed certain regulations regarding the casings of wells in drilling, to shut out water from the oil sands; and many of them have prescribed with some minuteness the manner in which abandoned oil wells should be plugged, with the idea of guarding the oil sands. A number of the laws have recognized that the rights of the adjoining owners involved, and have permitted them to enter and plug a well properly, if the owner refuses to do it. Some States, as for instance, Louisiana, Oklahoma, and California, have provided an efficient agency to enforce the laws against waste, but many have failed to do this.

The United States Geological Survey and the Bureau of Mines have for many years done a great deal of conservation work. The United States Bureau of Mines has given a great deal of attention to the investigation of waste of oil and gas and of methods of preventing such waste. The Petroleum Division of the Bureau of Mines was created in 1915, and in the years following it devoted much attention to the problems of elimination of waste in production, underground wastes, increasing recovery of oil from sands, and other problems.

Finally it should be said that many private operators have evinced considerable interest in the conservation of oil and gas, the standard companies taking the lead in this. The American Petroleum Institute, the National Association for the oil industry, has worked for better conditions in the industry.

State Development of Forests in New York

This division of lands and forests has charge of the administration of the Forest Preserve and of all State parks and historic sites coming within the Sixth Park Region, which includes the 16 Adirondack and Catskill counties, and also the counties between the Adirondacks and the Catskills.

The Division has charge of all forestry activities carried on by the Conservation Department. This includes:

1. Forest fire control, for which an organization has been established and is maintained, giving intensive fire protection to the Adirondacks and Catskill fire towns aggregating 7,500,000 acres. A less intensive organization supervises forest-fire control work in the so-called "Fire Districts" established by the Conservation Department. These districts embrace 9,500,000 acres, including Long Island, the area east of the Hudson River, the territory south and southwest of the Catskills, and the counties of Allegheny, Cattaraugus, and Steuben, in the southwestern part of the State.
2. Reforestation, including the operation of five forest-tree nurseries with an output of 40, 000,000 trees per year; the planting of trees on State Forest Preserve land and on State reforestation areas in connection with the Hewitt reforestation program; the distribution of trees free to counties and municipalities and at cost of production to owners.
3. Acquisition of lands for the Forest Preserve at the rate of about 30,000 to 40,000 acres per annum, and for the State reforestation areas at the rate of about 40,000 acres per annum.
4. Forest-pest control, including suppression of the gypsy moth and control of the white pine blister rust, together with other lesser insect pests and tree diseases.
5. Recreational development of the State Forest Preserve, including the establishment and operation of public camp sites with a daily capacity of 30,000 campers and the upkeep and maintenance of 500 miles of trails in the Adirondacks and Catskills.
6. Forest investigations for the gathering of necessary information for the guidance of the Department in its nursery operation, reforestation and pest-control activities.
7. General forestry work, including the giving of advice in forestry to landowners, administration of State forests and publication of bulletins and reports on forestry and State forest activities for the information of the public.

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These are some of the topics which were occupying the various sections of the American Chemical Society, Tuesday, March 29, as that body continued the session of its eighty-third annual meeting, then in progress at the Hotel Roosevelt, New Orleans.

The New Orleans physicians who have been experimenting for a long time on the prevention of adhesions are Drs. Robert Walton, Alton Ochsner and Earl Garside of Tulane university medical school, the paper being read by Dr. Walton, and the sum and substance of the method proposed being the introduction of a protein-digesting enzyme, papain, at the time of the operation.

The work of the New Orleans scientists was carried out on experimental animals, on which operations calculated to produce adhesion were performed until, in some cases, "dense adhesions bound the abdominal organs into a firm mass." These adhesions reformed even when they were surgically broken up, they report.

"However," Dr. Walton explains, "if the weak papan solution was introduced at the time of the operation, the adhesions reformed in a much smaller proportion of the cases. It was suggested that the exuded fibrin, a glue-like substance principally responsible for the development of adhesions, was dissolved just enough to prevent its developing into permanent adhesions."

As for the Louisiana oyster, which may be prescribed some day by physicians in accurate dosages, that succulent bivalve came into its own in a paper read before the medical symposium of the society by E. J. Coulson of the United States Bureau of Fisheries in collaboration with Harold Levine and Roe E. Remington of the South Carolina Food Research Commission.

Dr. Coulson explained that the original work in this field, performed by Drs. Levine and Remington, had already demonstrated that 5 grams of oysters a day, fed to animals in whom anaemia had been produced by keeping them on a milk diet, had shown extremely valuable curative properties.

"Since in the original investigation oysters from only one locality (South Carolina) were used, it became an important question as to how far oysters generally could be considered a food of anti-anaemic value. Accordingly a general study of oysters from all coasts of the United States has been made by the Bureau of Fisheries.

"Oysters from the Atlantic coast south of Maryland, and of the Gulf coast, are significantly richer in iron than those of the North Atlantic. Oysters from states south of Maryland and of the Gulf produced complete recovery in from three to five weeks, while oysters north of Maryland required more than eight weeks to produce the same result. A few natural

(*Continued on page 37*)

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QUEER FISH FOUND IN GULF

(*Continued from page 26*)

probably never enters the Gulf, but the whale shark, almost as large, does live in these waters. Immense in size and sluggish in its movements, it is provided with very small teeth. Specimens have been caught measuring 38 feet in length and weighing more than 26,000 pounds. Attacks blamed on sharks are probably often assaults of barracuda, the bulletin suggests.

LOOKDOWN GROTESQUE

A glance through the illustrations of the booklet suggests that fish as well as members of the human species have peculiarities of facial expression. Few of the sea animals presented have more grotesque faces than the lookdown whose sloping face and underslung jaw suggest a prize fighter.

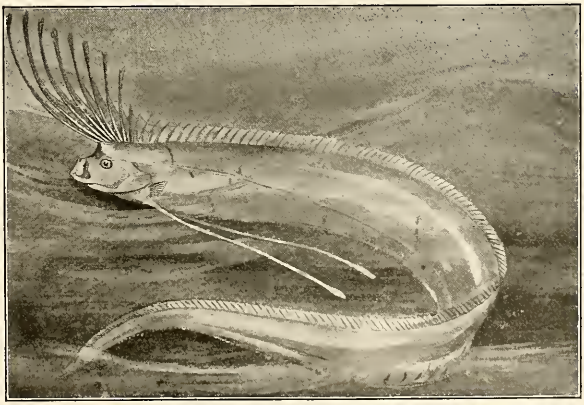
Brilliantly silver in coloring, the lookdown appear much like the decorations found on Japanese screens. It is a member of the famous pompano family and when grown measures about a foot in length. The species is very common in Louisiana waters.

"No book on sea fishes," says the bulletin, "would be complete without some account of the sea serpent. Sea serpents have been seen in many parts of the world, at many times, by observers, in all conditions of sobriety and intoxication. A careful analysis of sea serpent stories indicates that, undoubtedly, there is some actual basis for many of them, even after making full allowance for excitement, disturbed vision and the fisherman's traditional exaggeration. Frequently thread eels and the unrelated wolf eels, are brought to the scientists as specimens of young sea serpents.

LOOKS LIKE SERPENT

"There is, however, one fish that may well be termed a sea serpent. Records of it, fully authenticated by specimens, have been repeatedly encountered. The oarfish is known to reach a length of from 20 to 30 feet and is apparently accurately described as having a horselike head with a flaming red mane. The creature is harmless, weak in muscle as well as feeble in mind. The fact that it has been taken in Florida indicates the possibility that it may appear in our waters."

In the realm of game fish, Mr. Gowanloch describes the silver king or tarpon, the pompano, the red snapper, the Spanish mackerel and others. Some space in the book is given to a discussion of tackle to be used in catching saltwater game and food fish.



THE OARFISH (*Regalecus glesne*)

OYSTER "MEDICINE" IS FOUND

(*Continued from page 35*)

foods, such as beans, chard, spinach, lean beef and liver equal or excel the oyster in iron content, but as a source of both iron and copper in natural form the oyster can be compared only with liver."

North Atlantic marine society received another blow when the codfish, frequently described as the "state bird of Massachusetts," received very unfavorable mention as a source of vitamin-bearing liver oils as compared to the halibut, although the latter fish is a native of the same waters as the cod. The paper reporting this comparison was prepared by A. D. Emmett and O. D. Bird of the research laboratories of Parke, Davis and Company, and C. Nielsen and H. J. Cannon of the Abbott Research Laboratories of North Chicago.

"Halibut liver oil," their paper reads, "has, as a rule, from 100 to 110 times the vitamin A potency of cod liver oil. For example, under strictly comparable conditions, the growth produced in experimental animals by halibut liver oil compares favorably with that produced by doses of cod liver oil 100 times greater. The laboratory experiments revealed further the interesting fact that animals fed halibut liver oil in massive doses manifest no sign of discomfort or disturbances. Thus, daily doses as high as 10,000 times the amount of vitamin A and 400 times the amount of vitamin D required to cure deficiency symptoms were not only well tolerated but produced normal growth in both male and female animals."—*New Orleans Item.*

LOUISIANA BULLFROGS

(*Continued from page 18*)

some frog hunters use a mechanical device known as "frog catchers."

In the spring of the year, when the bullfrogs are banded together, it is only a matter of how many frogs a hunter can carry away in his sack. Fortunately for the species, they breed in the bottomlands which are farthest from the ridgelands, and in those localities a hunter must go, waist deep, to obtain these bullfrogs, and can not take more than 50 or 60 in a night. This is very arduous work for the hunters, but they are a courageous group of people and take hazard among the numerous snakes, spiders, alligators and other dangerous species, lurking in these bottomlands of Louisiana, in order to obtain their catch.

From the last part of February to the end of October, these frog hunters dispose of their catch to purchasing agents of the frog shippers. In all stores through numerous towns surrounding the shipping point, which act as agencies for the shippers, these hunters bring their frogs to be sold. The shippers pick up these bullfrogs from stores daily, and truck them to the shipping point. There the frogs are placed in ponds where fresh water is pumped frequently, and crayfish and other living specimens are fed to the frogs until they are ready to be slaughtered for the market. The heads are removed and drawn or entrails taken out. They are graded by size and dressed; the larger bullfrog called "Jumbo" weighing from 10 to 12 pounds per dozen. The small size termed "Mediums" weighing from 6 to 8 pounds per dozen, and the smallest size weighing from 4 to 6 pounds per dozen are termed "Small." After being graded in the three commercial sizes, they are strung in dozen bunch lots and are then packed in barrels and tubs well iced, and are ready for shipment. All bullfrog shipments are made by express, and the Express Company assumes full responsibility for the safe arrival of these perishable shipments in first class condition. While in transit these shipments are re-iced frequently, until they reach proper destination.

No shipments or orders are too large or too small for the Louisiana Frog Dealers, their orders ranging from one thousand dozen, to as small as one frog if shipment is requested, as they are fully equipped to take care of all orders throughout the country.

During 1918, after much slaughter of undersized Bullfrogs, the Department of Conservation recommended laws governing the taking of frogs in the State of Louisiana. The result was that Section 23 of the Louisiana Fish Laws was revised and amended at the close of the regular session of 1930—which reads as follows: Section 23; "Frogs may be taken during any season of the year with the aid of a jack light or other light, and by means of mechanical devices known as "frog catchers," provided these do not puncture the skin of the animal. The taking of frogs by means of spears or other devices which puncture the skin of the animal is especially prohibited under this Act.

"It shall be lawful for any person to take any species of small frogs known variously as grassfrogs, leopardfrogs, springfrogs, etc., for scientific, educational or for propagating purposes, regardless of their size, but their taking for sale for food is especially prohibited.

"The restriction as to the taking of bullfrogs under four and a half (4½) inches in length shall not apply to bullfrogs taken for scientific research or for educational or propagating purposes, except that their sale or use for student laboratory dissection is hereby prohibited."

OYSTERS AS A SUMMER FOOD

(*Continued from page 23*)

oyster contains elements which makes it one of the greatest foods for blood building. The oyster is rich in iron, copper, manganese and other salts, which makes it an ideal food to rebuild the worn out red corpuscles of the blood. Science claims that the iodine content in oysters is useful in preventing common goitre. Only fresh liver and oysters contain the animal starch called glycogen. Oysters are urged by scientists as a preventative against anaemia, and are being widely used as a cure for this dreaded disease.

So, you may eat oysters, and be sure you are helping your system to rebuild the red corpuscles in your blood, and this means a return of that "peppy" energetic feeling which comes with a healthy blood system.

And, as lagniappe, if another "R" is needed as a reason to correct that R month fallacy, use an R for Retrench. During these times, to Retrench is to be smart. Oysters are cheap, so be smart, and eat oysters.

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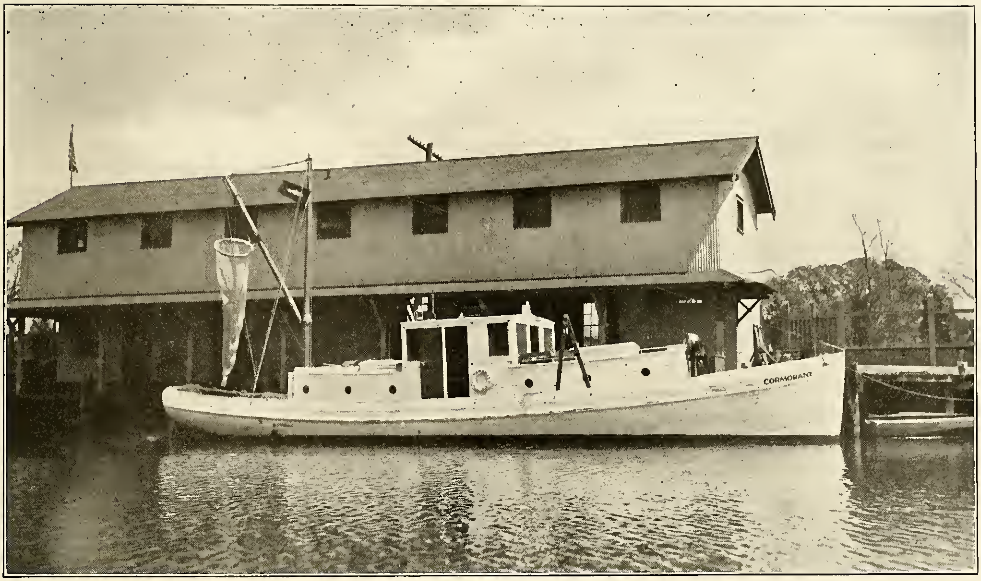

THE RESEARCH BOAT

The Black Mallard docked at the Department of Conservation Wharf. This boat was delegated by the United States Bureau of Fisheries and outfitted by the Louisiana Department of Conservation for the co-operative Shrimp Investigations in Louisiana. She has a length of 57 feet, a beam of 14½ feet, a depth of 4½ feet, and is powered with a 150 H. P. Palmer engine. The large conical net suspended from the boom is made of closely woven silk and is used for catching the eggs and larvae of the shrimp. In order to honor a typically native Louisiana game bird, the name of this boat was recently changed to **Black Mallard.**

Federal And State Co-Operative Shrimp Investigation In Louisiana

By F. W. WEYMOUTH

In Charge, Shrimp Investigation

FOR many years the production of shrimp has steadily increased until in 1930 it ranked as the fourth most valuable canned fishery product in the United States. This rapid development has not been unaccompanied by signs of depletion. Many people in the industry have applied to the State and Federal agencies for an investigation of this valuable animal. Finally, in 1930, funds became available, and the United States Bureau of Fisheries was at last able to accede to these requests. The services of Dr. F. W. Weymouth and Milton J. Lindner were obtained and a comprehensive investigation was planned. Later Gordon Gunter was added to the staff for work in Louisiana.

State cooperation on the South Atlantic and Gulf Coasts was considered indispensable. Fortunately, Louisiana, the producer of approximately one-half of the shrimp catch in the United States, had organized, during the same period through the activity of Commissioner Robert S. Maestri of the Department of Conservation, a Bureau of Research and Statistics. Colonel Hu B. Myers was appointed Director of this Bureau, J. N. Gowanloch was engaged as Chief Biologist and Forrest V. Durand as Assistant Biologist. This circumstance offered an unusual opportunity for a co-operative program with both State and Federal governments. In a somewhat similar manner Georgia and Texas also joined in this investigation. As a result, a joint program has developed which will provide a sound basis of scientific facts for the management of the natural resource upon which the welfare of the shrimp industry and everyone connected with it must depend.

The combined staffs of investigators formulated an intensive plan of study with the following objectives:

A. To maintain the optimum productivity of the shrimp fishery and

B. To furnish biological information useful to fishermen, packers and legislators.

In order to arrive at these objectives the fields of research were divided into seven following classes:

1. Study of the life histories of the principal commercial species of shrimp, including breeding, spawning, embryology, larval growth and longevity.
2. A statistical analysis of abundance which would require a compilation of the existing data and plans for the gathering of future statistics.
3. Observation of the habits and reactions of the young and adult shrimp in relation to food and food getting, migrations, molting, spawning, temperature and salinity.
4. A systematic examination of all shrimp occurring in the commercial catch in the various fishing localities and biometrical studies of the principal species throughout their range for the determination of possible racial differences which would have a bearing on problems of migration or local depletion.
5. A consideration of the effects of fishing on the composition of the shrimp catch and on other species of economic importance in relation to gear, localities and time.
6. An examination of the anatomy of the principal species of shrimp in relation to spawning and feeding.
7. A study of diseases and parasites affecting the shrimp.

The solution of the problems relative to classes 3, 6 and 7 were chosen by the investigators of the Department of Conservation, and those pertaining to 1, 2, 4 and 5 were delegated to the Bureau of Fisheries scientists. General cooperation, advice and assistance were to be given by all workers, both Federal and State, on every problem.

In order to conduct research on the fishing grounds, a boat was secured by the Bureau of Fisheries and outfitted for fisheries and oceanographic work by the Department of Conservation. This vessel, named the *Cormorant*, a fifty-seven foot, one hundred and fifty horsepower gasoline launch, was detailed for use in the co-operative shrimp investigation in Louisiana. The Department of Conservation kindly provided quarters for the Bureau of Fisheries investigators in the laboratory furnished for their own Bureau of Research.

Progress has been made on all the problems outlined above and voluminous data have been secured for analysis and study, although at least another season's data must be secured in order to corroborate the evidence that is at hand. Preliminary evidence indicates a short life span for the shrimp and that the fishery is based almost entirely upon young or immature individuals.

In an attempt to determine the present abundance of the shrimp, it was found that the statistics on the catch were quite inadequate for any such analysis. As everyone realizes, a definite knowledge of the abundance is absolutely essential to the welfare of the industry; consequently, the adoption of a system whereby complete records may be obtained on the catch of each fishing boat each day is strongly urged.

NORTHWEST LOUISIANA GAME AND FISH PRESERVE

(*Continued from page 19*)

during the recent flood. However, gauge readings, both above and below the dam, prove that the dam had no appreciable effect on the high water level in the lakes. That is to say, that the water would have risen just as high and stayed there just as long, if the dam had not been there.

In other words, while the dam will hold the water at a minimum constant level, yet its capacity to discharge flood waters over the crest and through the four large sluices will be greater than the stream capacity to take it off into Red River.

There will be twenty-three square miles or 15,720 acres of water surface, having a combined length of, say, twenty-three miles and an average width of one mile.

It is difficult not to grow enthusiastic over this splendid achievement even though one lives far away. For one who lives nearby, these lakes will be an everlasting source of keen enjoyment and profit.

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